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NEW CONCRETE DAM ACROSS MAIDEN CREEK AT GLEN GARY

CONCRETE DAM AND CONDUIT

In Connection with the Maiden Creek Water Supply of Reading, Pa.—Lead Expansion Joints—Inverted Siphon—Intake and Screen—Reinforcement of Conduit—Water Tight Manholes

As described in our issue of April 20, a considerable part of the water supply of Reading, Pa., is obtained from Maiden Creek, a tributary of the Schuylkill river with a drainage area of 210 square miles. From this it is expected to obtain ultimately something over ten million gallons per day, and filters are being constructed having a combined capacity of about $3\frac{1}{2}$ million gallons with one unit out of commission. The point along the creek where the water is taken for the supply is about eight miles north of the center of the city. At this point a concrete dam has been constructed just below and to replace an old timber dam which is shown in Fig. 2; the new dam, with water flowing over it, being shown in Fig. 1 at the head of this article. At this dam is an intake, from which the water is led through a conduit to the filters which are about 8,300 feet distant. Both the dam and the conduit leading to the filters are built of concrete; the latter being in process of construction.

The Glen Gary dam is 200 feet long between end abutments, is 4 feet wide at the top and 9 feet at the bottom, and varies in depth from about 9 to 12 feet. The entire dam rests upon solid rock, which was found very close to the surface all the way across the stream; the entire width of dam being set in a trench excavated at least 18 inches deep in the solid rock. It was constructed with the upstream face

3 feet below the breast of the old timber dam. The existence of a dam made it comparatively easy to divert the entire flow around the site of the work; a race existing on the right bank of the creek offering facilities for this purpose. The section of the dam is shown in the illustration Fig. 3, and Fig. 4 shows in section the tongue and groove used to key together the several sections of the dam. Each section was built as a monolith, and when concreting had started on any particular section it was continued without stop until that section was completed. Alternate sections were built first, and the intermediate spaces then filled in. The concrete was mixed 1:2:4, and was made fairly wet, so that no ramming was required, but it was thoroughly spaded to drive out the air and give a smooth face. The forms were made of boards fastened securely to templates and a very smooth face was secured, as is shown by the illustration, in which the water is gliding over the face of the concrete and the few irregularities shown in the flow are caused by projections of fractions of an inch only. The space between the old and the new dam is filled with sediment which had collected in the pool above the dam, thus practically making the two dams one. There appears to be no leakage whatever either through or under the new dam.

The construction of this dam was done under contract by



FIG. 2.—OLD TIMBER DAM ACROSS MAIDEN CREEK

Carl R. Camp of Montrose, Pa. The prices were as follows: Diverting water, \$500.00; pumping and bailing, \$600.00; excavation \$4.80 per cubic yard; filling 85 cents per cubic yard; concrete masonry \$5.10 per cubic yard (not including the cement); and cement, \$1.20 per barrel delivered, there being estimated $1\frac{1}{2}$ barrels per cubic yard of concrete.

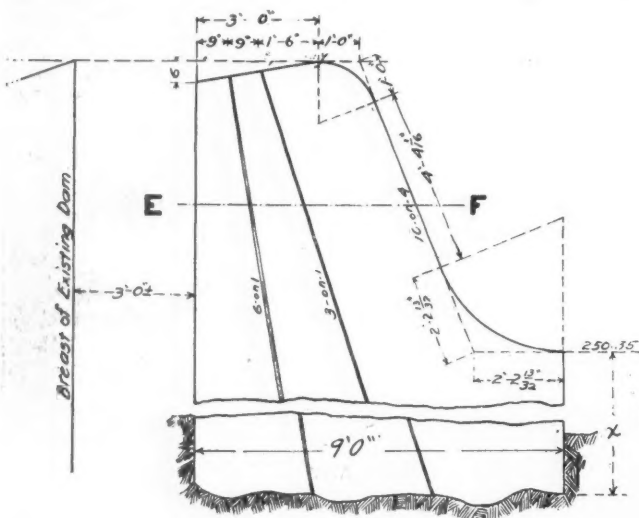


FIG. 3.—SECTION OF DAM

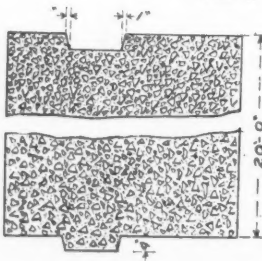


FIG. 4.—SECTION E-F

The intake is a concrete well 13 feet by 8 feet inside dimensions, enclosed on three sides by walls 3 feet thick and roofed over with a 6-inch reinforced concrete slab supported by two 7-inch I-beams. The fourth side is composed of a screen. The conduit to the filters begins in the center of one end of this intake. On the inside of the opening by which the conduit is continued through the wall of the intake there is built into the wall a short length of 60-inch flanged pipe, to which is bolted a 60-inch Coffin circular sluice valve with a ball-bearing standard; the stem of this valve passing up vertically through an opening in the roof of the intake. The junction between the intake and the conduit is made with a tongue-and-groove expansion joint similar to that used between sections of pipe, to be described later.

The screen is composed of 125 $\frac{1}{2}$ -inch by 3 inch bars set vertically $\frac{3}{4}$ inch apart in the clear, these bars being 9 feet 5 inches long. The bars rest against the concrete roof and floor of the intake and against two intermediate horizontal 5-inch channels built into the masonry at the sides of the opening, to which the screen is bolted. The bars are grouped into eight sections, each held together by four $\frac{7}{8}$ -inch bolts passing through 16 bars and $1\frac{1}{2}$ -inch pipe separators which are used between them. Any section of the screen can be removed if this should ever be found desirable.

The conduit is circular in section, 5 feet in diameter, with a grade of 0.00027. It is 6 inches in thickness throughout the upper half, the lower half being, on the outside, in the form of one-half an octagon, the thinnest portion of the shell here being 6 inches. The sewer is reinforced with Corrugated Bar Company's square rods, the transverse rods being $\frac{1}{2}$ inch square and 8 inches apart and the longitudinal rods being $\frac{3}{8}$ inch square and 7 inches apart. The transverse rods are placed so as to come within $1\frac{1}{2}$ inches of the interior of the sewer at the top and bottom and $1\frac{1}{2}$ inches of the exterior of the sewer at each end of the horizontal diameter. This conduit extends

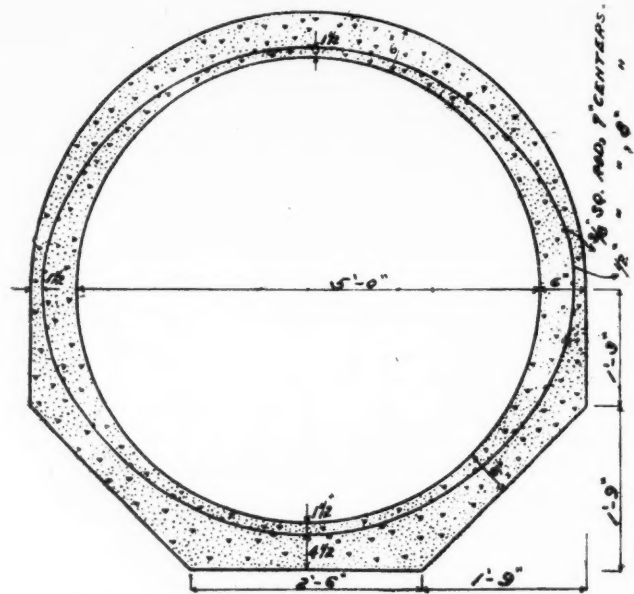


FIG. 5.—SECTION OF REINFORCED-CONCRETE CONDUIT

about 7,700 feet from the intake to a siphon under Willow Creek, there being included in this length 12 manholes. The entire conduit may be placed under some pressure and provision is made for this in the manholes as well as in the conduit by placing on the tops of the manholes, in addition to regular manhole castings similar to those used for sewers, an additional casting to which is bolted a cast-iron cover, four bolts being used and a gasket being placed between the head and cover to make a water-tight joint.

Most of the conduit is in cut, but is covered not more than 2 or 3 feet deep over a considerable part of its length. Part of it, however, is in very shallow cuts and two or three short stretches rest practically on the surface, there being at one point a spring which is carried under the culvert by drain pipe through a narrow channel, across which the conduit is carried by steel beams.

The concrete is being mixed 1:2:4, Phoenix cement being

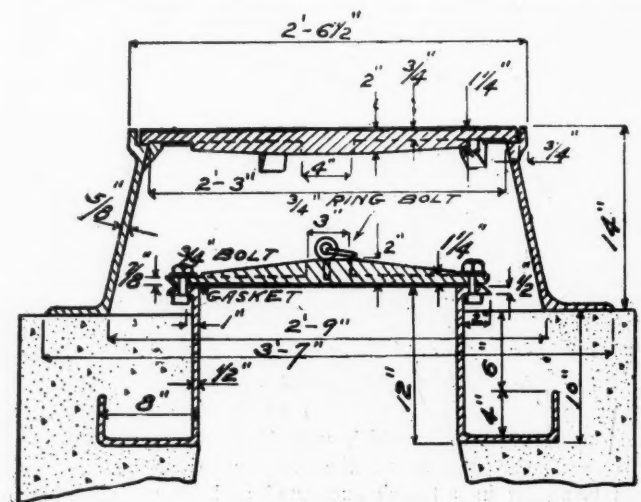


FIG. 6.—SECTION OF WATER-TIGHT MANHOLE HEAD

used. A Chicago No. 1 mixer is used, and the concrete is handled by wheelbarrows. After the trench has been excavated to grade concrete blocks are set about 10 feet apart in the bottom of the trench and in the center line of the conduit, the top of each block being on the grade of the inside bottom of the conduit and containing a notch to receive the bottom longitudinal reinforcing rod. One of these may be seen in the photograph, Fig. 7. The forms used are composed of wooden centers covered with wooden lagging, each length of arch center being made of two forms which are separated at the top by a tongue strip which holds them apart, but which is removed when the sewer is completed, and thus allows a collapsing of the centers, permitting them to be withdrawn. The transverse reinforcement rods are maintained at the proper position by small pieces of wood of the proper thickness wedged between them and the centering. The longitudinal reinforcement is fastened to the transverse by soft-iron wire. The forms are painted with crude oil to prevent the concrete from adhering to them.

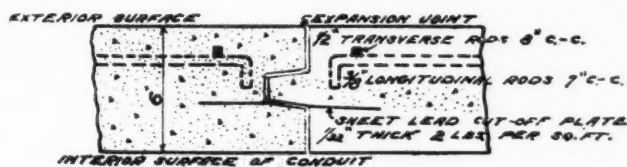


FIG. 8.—EXPANSION JOINT OF CONDUIT

The conduit is built in sections, each 40 feet long. Between adjacent sections is an expansion joint, a groove about 2 inches deep and two wide being left in the forward end of each section, in which is formed a corresponding tongue in the following section. In order to make this joint water-tight a buckled ring of sheet lead is placed so that one-half of the sheet of lead is imbedded in one section and the other one-half in the adjacent section, the buckle coming between the face of the groove and that of the tongue. This sheet of lead thus forms a bond between the sections, and should the joint open at all, the flexi-



FIG. 9.—CONDUIT SHOWING REINFORCEMENT IN PLACE

bility of the buckle will permit this without any breaking of the lead and thus keep the joint watertight.

At the crossing of Willow Creek four 30-inch cast-iron pipes take the place of the 60-inch concrete conduit, two of the pipes having been already laid, while the laying of the other two is deferred until the increase in the consumption of water shall require them. Between the ends of the conduit and the siphons is a concrete chamber 24 feet 9 inches long transversely of the conduit, 5 feet 3 inches wide and $7\frac{1}{2}$ feet high, all interior dimensions. The walls are 24 inches thick and the roof is a circular arch on the inside and the flat on the outside, the thickness at the crown of the arch being 8 inches. In the end of each chamber toward the creek four 30-inch cast-iron pipes, each 3 feet long, are imbedded, each carrying two flanges which extend for several inches into the surrounding concrete as a cut-off to prevent leaking. The inner end of each of these pipes is provided with a 30-inch Coffin circular sluice valve. Each of these siphons is provided with a blow-off T in the bed of the creek, to which is connected a 10-inch cast-iron pipe which is



FIG. 7. 60-INCH MAIDEN CREEK CONDUIT UNDER CONSTRUCTION

controlled by a 10-inch gate valve. This siphon is 200 feet long and has a drop of about $8\frac{1}{2}$ feet from the cord connecting the two ends. The hydraulic gradient of the siphon is 0.001. This siphon was laid by the city by day labor.

The crossing of the spring above referred to and the small stream issuing therefrom was constructed as follows: A trench about $6\frac{1}{2}$ feet wide, flat on the bottom and extending at least $2\frac{1}{2}$ feet below the ordinary bottom of the conduit, and 4 or 5 feet lengthwise of the conduit, was constructed on each side of the stream, and with a space of 16 feet between the two, and filled with concrete to serve as abutments. On top of these abutments were placed four 15-inch I-beams spaced about 18 inches apart and at such an elevation that their tops were one or 2 inches lower than the invert of the conduit. The concrete was then carried up to the full width of the trench, filling in the haunches under the conduit and embedding the four I-beams; this concrete and the I-beams thus forming a bridge with 16-foot span resting upon the two concrete abutments. Before the building of the bridge and conduit across this span the space between abutments was excavated and four lines of 6-inch vitrified sewer pipe were laid transversely of the conduit and about 35 feet long, with open joints and surrounded with broken stone which was brought up to within about an inch of the under side of the I-beams. On either side of the conduit this broken stone was covered with 6 inches of screenings. The conduit was then completely covered with earth, the fill being carried up 24 inches above the extrados.

This work is being done under contract by Lambert A. Rehr, succeeding Chiles & Witman, who surrendered the contract soon after starting the same. The prices of the contract are as follows, the reinforcing bars and lead expansion joint rings being furnished by the city, and the cement for the concrete being paid for as a separate item: 60-inch conduit, \$4.15 per lineal foot; Portland cement, \$1.53 per barrel delivered on the work; excavation, 90 cents per cubic yard; extra concrete, \$3.75 per cubic yard; manholes, \$2.65 per vertical foot. Mr. J. F. Witman is the engineer in charge.

SEWAGE PURIFICATION IN WISCONSIN

In a bulletin of the University of Wisconsin, Prof. Geo. J. Davis, assistant professor of Hydraulic Engineering of that university, and J. T. B. Bowles, Sanitary Chemist in the State Hygienic Laboratory, have presented a discussion of sewage purification, with special reference to Wisconsin conditions, giving at the end a table which presumably lists all sewage purification plants in the State. According to this list these sewage treatment plants are as follows:

	Population.	Method of Purification.
Dane County Poor Farm	300	Septic tank and filters.
Elkhorn	2,500	Residential septic tanks.
Fond du Lac	15,000	*Septic tank and contact beds.
Lancaster	3,000	Septic tank and filters.
Madison	28,000	Septic tank and trickling filters.
Marshfield	6,250	Septic tank and filters.
Marinette	1,800	Filters.
Mendota Hospital	600	Septic tank and filters.
Milwaukee County Institutions	2,000	Septic tank and filters.
Northern Hospital .....	...	Septic tank and filters.
Monroe	4,000	Septic tank and filters.
North Milwaukee	1,200	Sedimentation tanks, aeration and filters.
Ripon	4,000	Filters.
Soldiers' Home .....	...	Filters.
Tomah	3,500	Septic tanks.
Wales Sanitarium	200	Septic tank.
Wauwatosa	3,000	Septic tank and sand filters.
Waukesha	8,000	Septic tank.
West Salem	1,000	Settling tanks.

In addition the following have prepared plans approved by the State Board of Health.

Athens	9,000	Septic tank.
Menomonie Falls	900	Sedimentation tanks.
Waupaca	2,900	Two septic tanks.
West Bend	2,100	Septic tanks.

*Not now in operation.

SEWER INTERCEPTORS AT COLUMBUS

Reason for Relief Sewers—Old Pit Interceptors Accumulate Sand and Debris—Description of New Gate Interceptors

By JULIAN GRIGGS, M. Am. Soc. C. E.

COLUMBUS, O., is in general sewered on the combined system, the exception being on the west side and at the south end of the city, where the separate system obtains.

The older combined sewers were designed for one inch of rainfall per hour. Since 1898 $2\frac{3}{4}$ inches of rainfall per hour has been the rule in designing combined and storm water sewers, using the McMath formula:

$Q = c\sqrt{AS}$, in which the coefficient c is taken at

.31 for rural districts,

.45 for suburban territory,

.62 for average city surfaces, and

.75 for well-built-up and well-paved areas:

A is the area in acres, and s is the slope in feet per 1,000 feet.

A number of large relief sewers on the combined system have been built in recent years. In some cases these have been located so as to cut off the upper half of the older sewers and lead their whole flow through the relief sewer to a new outlet, thus making the entire system which is affected adequate for good drainage under present conditions. In one case the whole of the dry flow of the upper half of the territory which was drained by a combined sewer to an Alum Creek outlet on the east side of the city was intercepted and taken by gravity through the relief sewer to the east side intercepting sewer, thus reducing by 50 per cent the volume of sewage required later to be pumped over the ridge from the east side sewage pumping station. The storm water continues to flow in the old sewer until it is half full, when the excess passes over a weir at the spring line of the old sewer to the new sewer, and thereby makes the sewers of that drainage district, both above and below the interceptor, adequate for the well-paved and built-up area which it now drains.

The weir as above described is one of the oldest and most commonly used devices for effecting a division of a part of the flow of sewers and drains. It is thoroughly satisfactory, being automatic in its action, and requires no more attention than the sewer itself.

The east side intercepting sewer is 6.8 miles in length, and varies in diameter from $2\frac{1}{2}$ to 6 feet. It is generally about 5 feet lower than the streams which it parallels, and lies near to. Its grades are such as give a velocity to its flow of about 2.3 feet per second. A part of it is nearly 50 feet below the surface, and was there constructed in tunnel. It passes below some twenty sewers built on the combined plan, which vary from about 2 feet to $10\frac{1}{2}$ feet in diameter. When built in 1892, circular inlets commonly about 12 inches in diameter were formed in it above the spring line for future connections, to intercept the dry flow of the combined sewers. A drip stone some two feet square was built into the sewer opposite each inlet and below the spring line, to take the wear of the constantly falling sewage when the interceptor should be in service. Later, when connections with the intercepting sewer were built, none of the inlets previously prepared were used, but for convenience in excavating new inlets were made at other nearby points.

The interceptors were simply pits in the bottom of the combined sewer with clay pipes from 6 inches to 15 inches in diameter leading from the pits to the intercepting sewer beneath. These pits were rectangular in plan and vertical sections, varying from 1.5 feet to 4 feet in these dimensions. The pipe usually led out of one side of the pit, but sometimes out of the bottom, and in one case a screen approximately 5 feet square, of $\frac{1}{4}$ -inch wire of about 2-inch mesh, was placed over the pit, with its down-stream edge resting on a dam about a

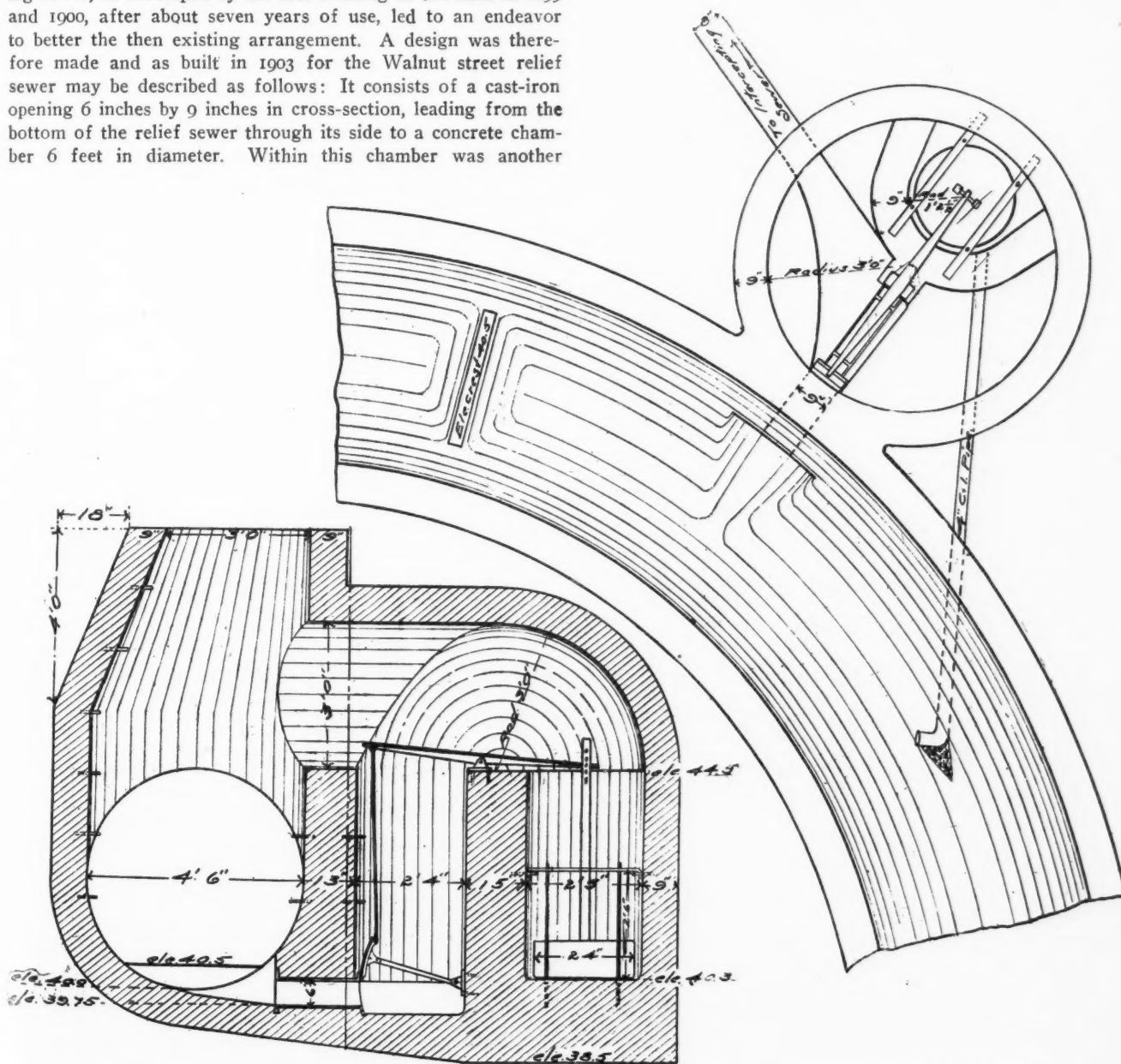
foot high, the screen sloping back up-stream to the bottom of the sewer. The screen was an afterthought, occasioned by the frequent stoppages in the 12-inch pipe interceptor. When the intercepting sewer was cleaned in 1899 a bar of gravel stones and boulders up to sizes of 10 inches in diameter was found for about 200 feet in length below this interceptor. This material had been mainly derived from the boulder clay through which this sewer system was built, caused by sundry failures of the arch in some of the oldest sewers, followed by the gradual caving down of the earth, presently to be indicated by a settlement or an opening at the street surface above the break. The fine particles were carried forward to the outlet of the sewer, while the coarse material was all collected in the bar as above noted. This particular sewer drains about 842 acres above the interceptor, and is liable to collect and transport a large variety of material, ranging from all kinds of cast-off clothing to fence posts, rails, furniture and lumber, so that the screen is but a partial remedy as, owing to the form of its diagonal mesh, it acts as a gill net to catch and hold all sorts of rubbish, and requires frequent cleanings.

In general, it may be said of interceptors of the pit type that a cleaning of them after every storm is necessary, and weekly inspections the rule, while daily inspections would be better if a continuous flow without stoppage is expected.

The large accumulations of sand and débris in the intercepting sewer, as developed by the first cleaning of the sand in 1899 and 1900, after about seven years of use, led to an endeavor to better the then existing arrangement. A design was therefore made and as built in 1903 for the Walnut street relief sewer may be described as follows: It consists of a cast-iron opening 6 inches by 9 inches in cross-section, leading from the bottom of the relief sewer through its side to a concrete chamber 6 feet in diameter. Within this chamber was another

concrete chamber 2 feet 5 inches in diameter holding a copper float of suitable size to balance and control a movable gate. The gate is in the form of a rectangle, $8\frac{1}{2}$ by 12 inches, on the surface of a cylinder of 2 feet radius, accurately fitting the outer end of the cast-iron opening above noted, which is about 21 inches in length as it passes through the side of the sewer. A fixed strut as a radius of the cylinder is securely attached to the gate and pivoted at its other end in a casting bolted to the face of the float chamber. A 5-foot lever arm, pivoted at its center to a casting bolted to the top of the wall of the float chamber, is attached at one end to the stem of the copper float and at its other end to a frame in a vertical position leading to the upper edge of the cylindrical gate. A 4-inch cast-iron pipe about 10 feet in length connects the relief sewer with the bottom of the float chamber. The upper end of the cast-iron pipe is turned downstream, and concrete is so placed above and around the same as to prevent its obstructing the flow by catching and holding floating material. A concrete dam 6 inches high is placed in the relief sewer invert just below the inlet of the interceptor.

Plans herewith illustrate more particularly the details of construction. It will be noted that cast iron is generally used for the parts of the device, as being less liable to rust than wrought iron, and that brass is used for the important bear-



PLAN AND RADIAL SECTION OF WALNUT STREET INTERCEPTOR AND INTERCEPTING CHAMBER

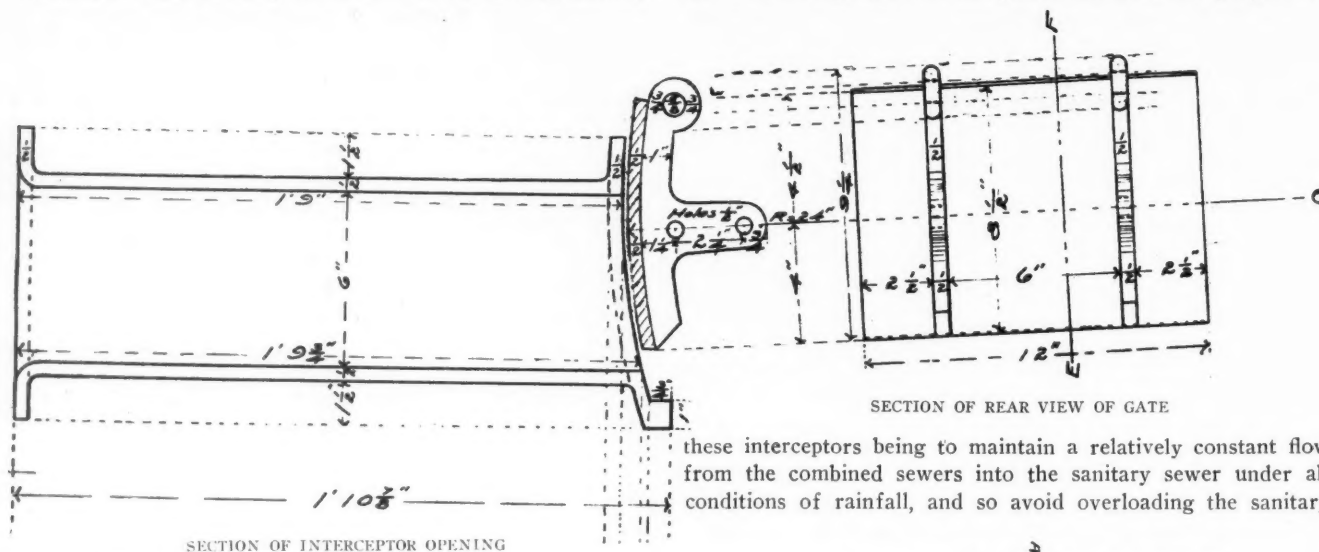
ings. The cast-iron parts are further protected with the Angus Smith pipe coating varnish.

Similar devices to control the flow to the intercepting sewer were installed in 1903, but of a larger size, being 12 by 24-inch openings, at Markinson avenue, on the south side separate system, and at Elm street, on the central relief sewer, which is of concrete 10½ feet in diameter.

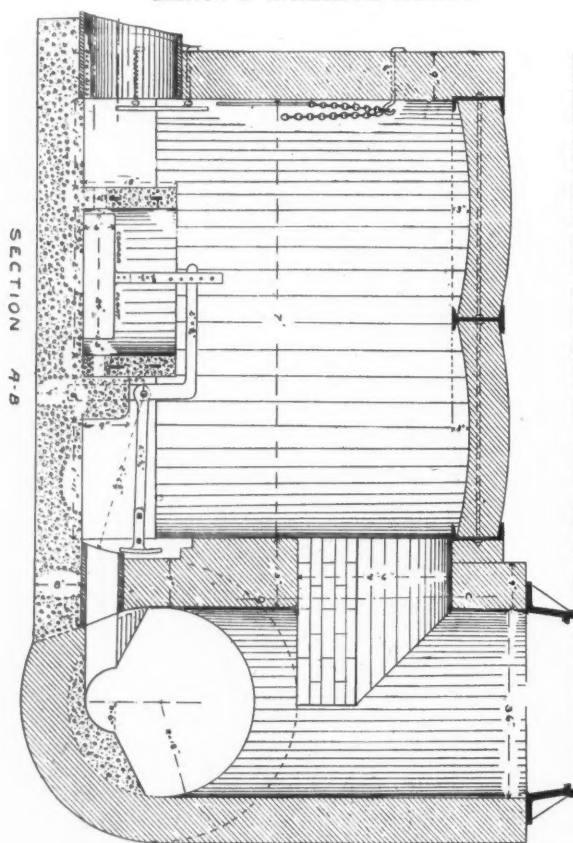
The South Side sanitary sewer now serves a comparatively

noted that an interceptor is necessary on the Markinson avenue sanitary sewer. The storm water overflow leads into the canal.

On the West Side sanitary system there are three interceptors, equipped with copper floats and cylindrical gates which operate somewhat differently from the East Side interceptors. Each of the combined sewers there is 3 feet in diameter. All of the dry flow passes into the interceptor, but the float is raised by sewage *after* it has passed the gate, the purpose of



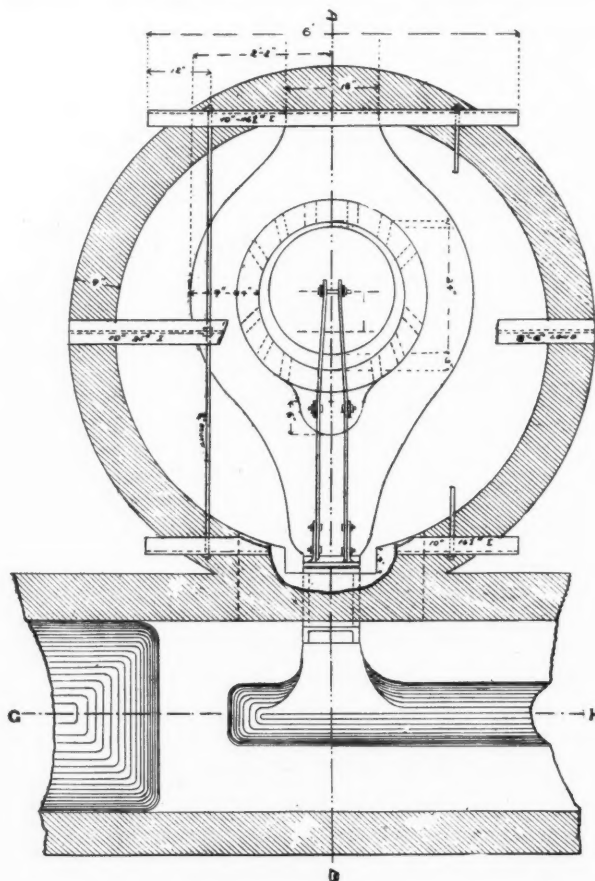
these interceptors being to maintain a relatively constant flow from the combined sewers into the sanitary sewer under all conditions of rainfall, and so avoid overloading the sanitary



SECTION OF WEST SIDE INTERCEPTOR

small population, all located within a mile of its outlet. The main trunk of this system is 4 feet in diameter, and is intended eventually to serve a population of 20,000 per square mile on about three square miles of tributary territory. On account of its large size it is now utilized for street drainage, and so postpones for a number of years any expenditure for large storm water drains, which have been projected and are to be built when, by increase in population, the inconveniences of surface drainage and of the present arrangement become too great.

It is on account of the admission of storm water as above



PLAN AND SECTION OF WEST SIDE INTERCEPTOR

system. The combined sewers in the West Side section of the city are few in number and of small size.

The intercepting devices described in this paper have been in use from six to seven years, and have given good satisfaction for all of that time. The movable gates are liable to interference from floating sticks or rubbish too large or too long readily to pass the gate openings, on which account periodic inspections at intervals of a week are necessary for best efficiency.

Similar devices are known to be in use in other cities, but detailed descriptions of the device with a movable gate are rarely seen. The installations of the same at Columbus were made with a view to trying them out for defects before equipping all of the interceptors with like arrangements.

ENGLISH TOWN PLANNING

REFERENCE has been made in previous issues to the housing and town planning act which became a law in England a short time ago and which supersedes all previous laws on this subject in that country. The general tenor of this act is well described by Vice-Consul General Carl R. Loop, of London, as follows:

The act is divided into three parts, of which part one, by far the largest and in many respects the most important portion, deals with housing. The Local Government Board, a branch of the national executive government, is constituted the central, and, almost without exception, final authority in all matters dealt with. It may, through local authorities, acquire by forcible means land sites desired for housing purposes, direct the closing or the demolition of insanitary premises, or compel the owners to clean up and prescribe the size of the gardens (yards) and open spaces. The act specifically inhibits back-to-back houses. Formerly (and the law still obtains as to houses not within the purview of this act) the signing of a lease by a tenant relieved the landlord of any further care or responsibility with reference to keeping the premises in repair, provided, of course, the lease did not specifically provide for the same. But now the landlord is legally bound to keep the premises in a condition of repair fit for habitation, which degree of fitness is finally determined by the Local Government Board.

The second part of the act, dealing with town planning, is a new departure in English legislation. Hitherto towns and cities have been permitted to grow in any haphazard fashion, with the result that vast sums of money have been spent in clearing sites, widening streets, and in providing sanitary improvements. Now, however, every scheme for the laying out of a new town or for an extension to one already established must be submitted to the Local Government Board for approval.

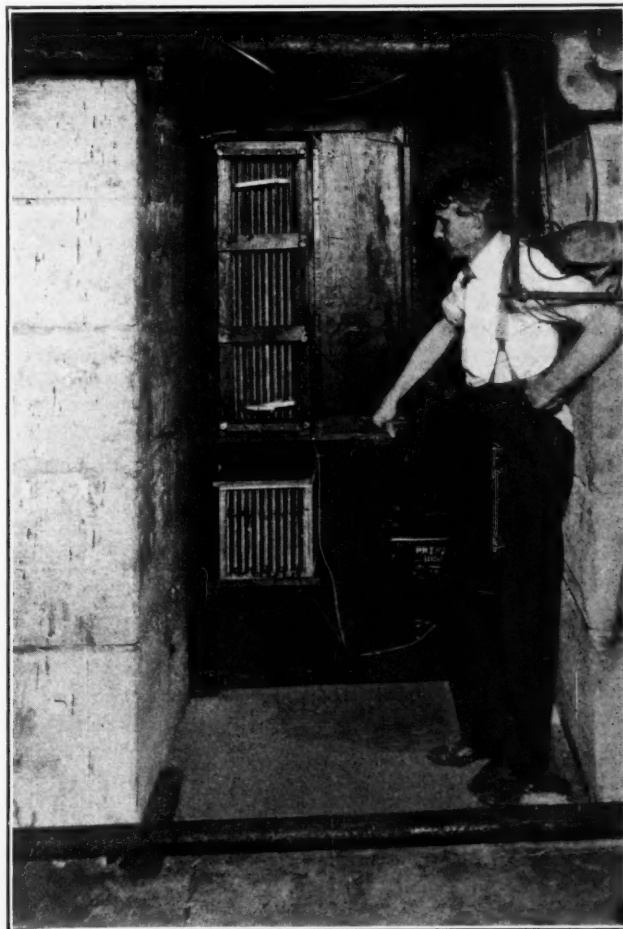
The third part of the act has to do with the enforcement of health and sanitary regulations. The office of county medical officer is created, and he must be a physician of standing and may not engage in private practice while holding office. Moreover, he may not be removed from office except for cause. It is his duty and he is invested with the necessary power to require periodical reports from subordinate officials on the state of health and sanitary conditions within their respective districts. He in turn must report to the Local Government Board. It is readily seen how important the medical officer becomes in enabling the Local Government Board to carry out the intent of the act.

There is also provision in this part of the act for the establishment by county councils of public health and housing committees. The housing committee of the London county council has recently recommended the building of 338 flats, cottages and shops on a site in western London obtained in 1905 for the sum of \$14,500, which covers 46 acres. The rents of these buildings will range from 85 cents to \$2.50 per week. Hitherto the dwellings provided have ranged from \$1.80 to \$2.88 per week. The council will spend \$362,123 on buildings, and \$100,873 on building roads and sewers.

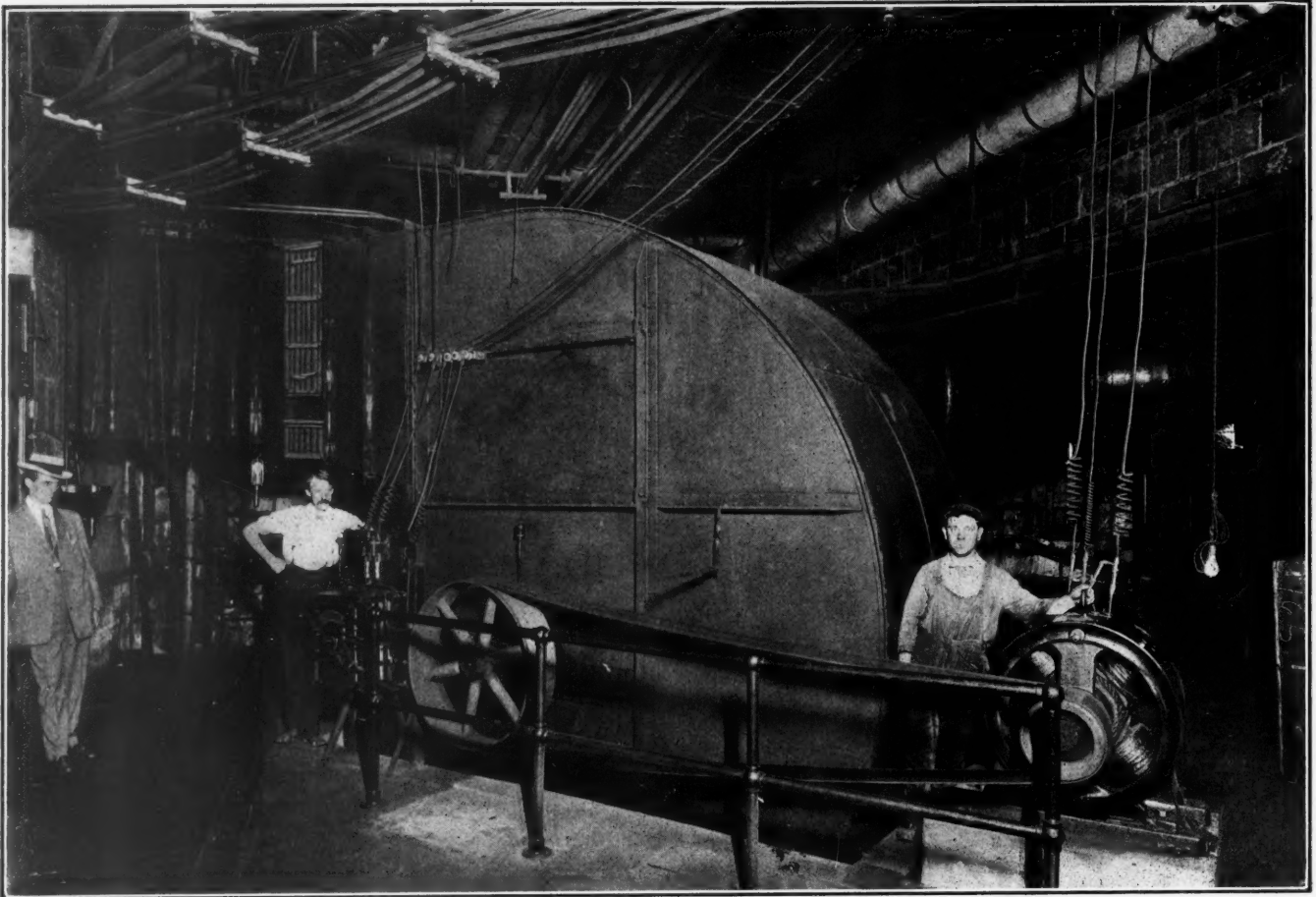
PURIFYING AIR OF PUBLIC BUILDINGS

THE ventilation of large public buildings, and especially those like public libraries, which are used continuously, is one of great importance, but concerning which architects and sanitarians do not seem to have reached or even approached a perfect understanding. One feature of the ventilation of the Chicago Public Library Building is the fact that it is believed to be the first installation of ozone apparatus for sterilizing the air used in ventilating buildings. This plant was put into operation and tested last summer. Over 10,000 cubic feet of fresh air per minute is supplied for ventilating the building, but the air in the main reading room has been a source of much adverse comment and discussion for several years, having been described last March by Health Commissioner Evans as unfit for use. Tests were made by Dr. Hutton soon after the installation. Some 55 tests showed, besides satisfactory germicidal and antiseptic results, an average reduction of 5 per cent in humidity. It is claimed that the use of the apparatus has resulted in a complete deodorizing of the main reading room, freeing the air of that obnoxious human aromatic odor which has for years so thoroughly permeated all papers, books and furnishings in this room. It is also claimed that all books and periodicals on the shelves, racks and tables are disinfected. The reduction of the humidity was an appreciable relief in the summer time, but the most severe test has been during the winter months, since the windows were then closed, and, in addition, the attendance was about double what it is in the summer.

The largest ozone generator is installed in a large air duct measuring 6 by 9 feet. It consumes about 6½ amperes of current per hour, with a discharge of more than 15,000 cubic feet per hour. The generator itself is 6 feet high, 11 inches thick and 1 foot wide, so placed in the opening of the air duct as to permit all the air to pass through it. A spray of water is used for washing the air before it passes through the generator, for if sprayed afterward much of the ozone would be taken up by



OZONE GENERATOR IN CHICAGO PUBLIC LIBRARY



OZONE GENERATOR, INSTALLED IN CHICAGO PUBLIC LIBRARY JULY 20, 1909

the water. From a feed wire of 110 volts a connection is made to a step-up transformer which discharges the current at a voltage of about 7,000. This feeds into a series of electrodes, which are in the form of ordinary hair brushes, by which a static electrical discharge is maintained, playing against a series of glass plates. Through this electric discharge air is forced and receives ozone gas of a purity shown by test to be 91.7 per cent. When the electrodes become dirty or clogged they are easily cleaned by rubbing them together, as one might clean two hair brushes. The upkeep is said to be practically nothing, and the consumption of current required, on a basis of 110 volts, to be 25 watts for 25 cubic feet of air per hour, 65 for 250 cubic feet, 75 for 500 cubic feet, 140 for 1,000 cubic feet and 660 for 10,000 cubic feet. The first three sizes are intended for residences and small buildings, the two larger for public buildings. The ozone plant in the Chicago Library was installed by the National Air Filter Company of that city. The first cost of one of the largest plants is about \$1,500.

OILING CATCH BASINS

Catch-basins are oiled by many cities during the summer to prevent the breeding of mosquitoes. This oil is naturally carried into the sewer with any water which flows off the street, necessitating re-oiling the traps frequently, the labor item of which is of more importance than the cost of the oil used. The Chairman of the Mosquito Extermination Committee of Newark, N. J., has introduced a simple device for keeping the surface of the water constantly covered with a film of oil at no expense for labor except that of occasionally refilling the can from which the oil is continuously applied. An ordinary two-quart oil can is suspended from the catch-basin cover or the wall just below it, and in the top opening in this is placed a long, very slender lamp wick, one end hanging out. From this the oil drips slowly into the basin, thus re-covering the water surface in a short time whenever the previous oil covering may be washed out. Five hundred of these are in use in Newark.

BENEFITS FROM SAND FILTERS

Reduction of Typhoid Fever in Philadelphia Due to Filtration—Seventy Per Cent. in Three Years, or Five Hundred Lives a Year

FRANCIS D. WEST, Chemist in Charge Torresdale Laboratory.

FILTRATION as exemplified by the English or slow sand filter has proven a success in Philadelphia.

Instead of being famed for its notoriously bad water, Philadelphia has, in the space of three years, so reduced its typhoid fever death rate as to be classed with Boston, Brooklyn and New York, cities with a pure water supply and a death rate per 100,000 of 18 to 22.

As late as January, 1907, George C. Whipple, in his book, "Typhoid Fever," wrote as follows: "To drink the city water at the present time in Philadelphia or Pittsburgh, or in any other city where the supply is notoriously polluted, is to take an unwarranted risk." Facts justified his remarks. It is for the purpose of calling the attention of all those interested either as sanitarians or as consumers that the following facts are given.

Fig. 1 shows the annual death rate per 100,000 in Philadelphia for the past 40 years. It will be noticed that previous to the year 1908 the rate was below 40 on only five occasions, reaching a maximum of 97 in 1876 due to the Centennial Exhibition, and a minimum of 33 in 1894. During these 40 years there were several improvements in the water supply system, such as the completion of the East Park Reservoirs, with a capacity of 680,000,000 gallons in 1887; the completion of the pumping station and reservoirs at Queen Lane in 1895, and the removal of the Kensington intake to Lardners Point. These changes doubtless were beneficial and improved the water supply for a time, but with increasing population, both in the city and on the watersheds, the water became so bad that in 1899 an expert commission, composed of Messrs. Rudolph Hering,

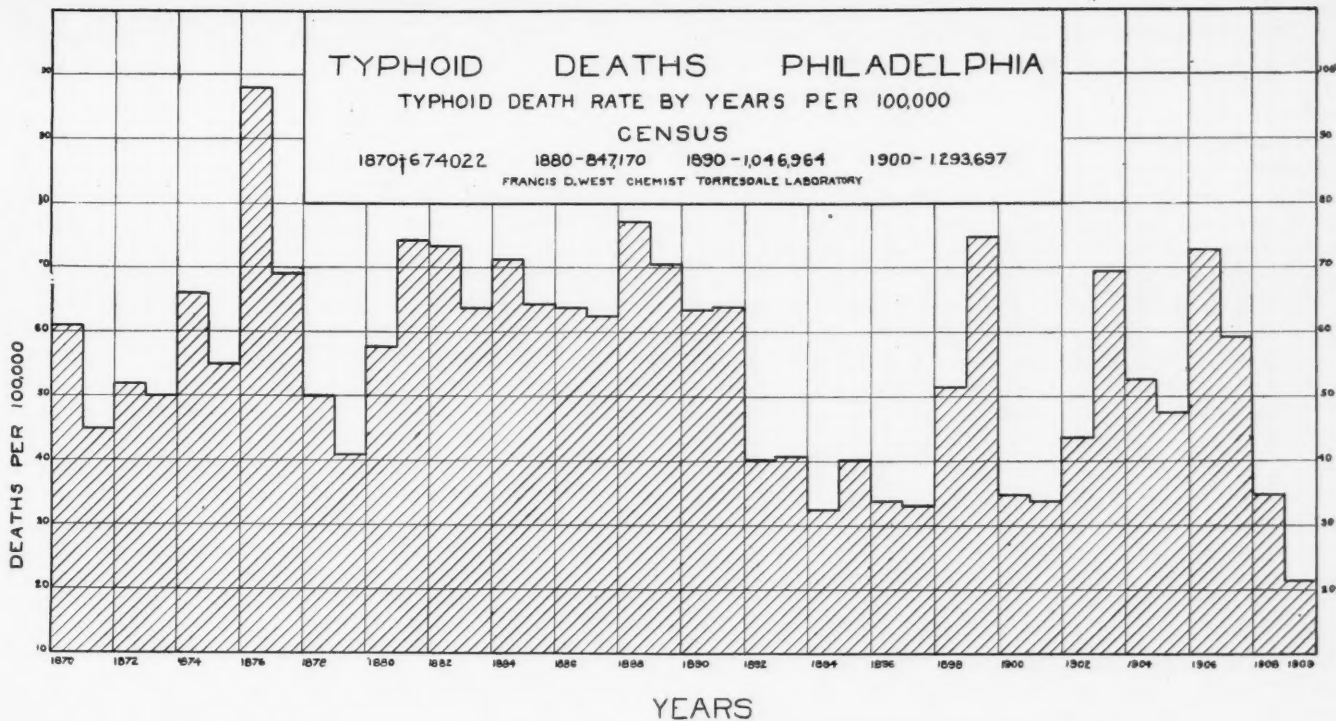


FIG. 1. TYPHOID DEATHS IN PHILADELPHIA FOR THE PAST FORTY YEARS

Joseph M. Wilson and Samuel M. Gray, recommended the present system of filtration.

Fig. 2 shows the number of deaths per 100,000 per month for the last four years. Deaths from typhoid fever in the past have been most frequent in the winter months after the early fresh-

ets. About the last of November we usually have heavy storms following a long dry spell.

All refuse along the banks of the rivers is washed down and was formerly served "raw." In fact, "liquid coal" was a standing joke in the city. Even now, with our filtration perfected, typhoid fever is highest in winter, though reduced about 90 per cent.

The deaths in 1906 numbered 1,061 in spite of the fact that three of our filter plants were running. But Roxboro, Germantown and West Philadelphia, supplied by these plants, had a reduction of about 80 per cent in the number of cases compared with the rest of the city.

Torresdale filter plant was started July 4, 1907, and began delivering 40,000,000 gallons a day to Frankford. Almost immediately the change was perceptible. This district, which was one of the worst in the city, became one of the best. The output was increased to 60,000,000 gallons daily on September 18, 1907. April 3 to May 12, 1908, the output averaged 86,000,000 gallons daily. May 12, 1908, to February 28, 1909, the average was 110,000,000 gallons a day. On February 28, 1909, the amount was doubled, due to the installation of preliminary filters. The final or slow sand filters are now operated at a maximum rate of 6,000,000 gallons per acre per day, instead of 3,000,000 gallons, the limit previous to the introduction of the

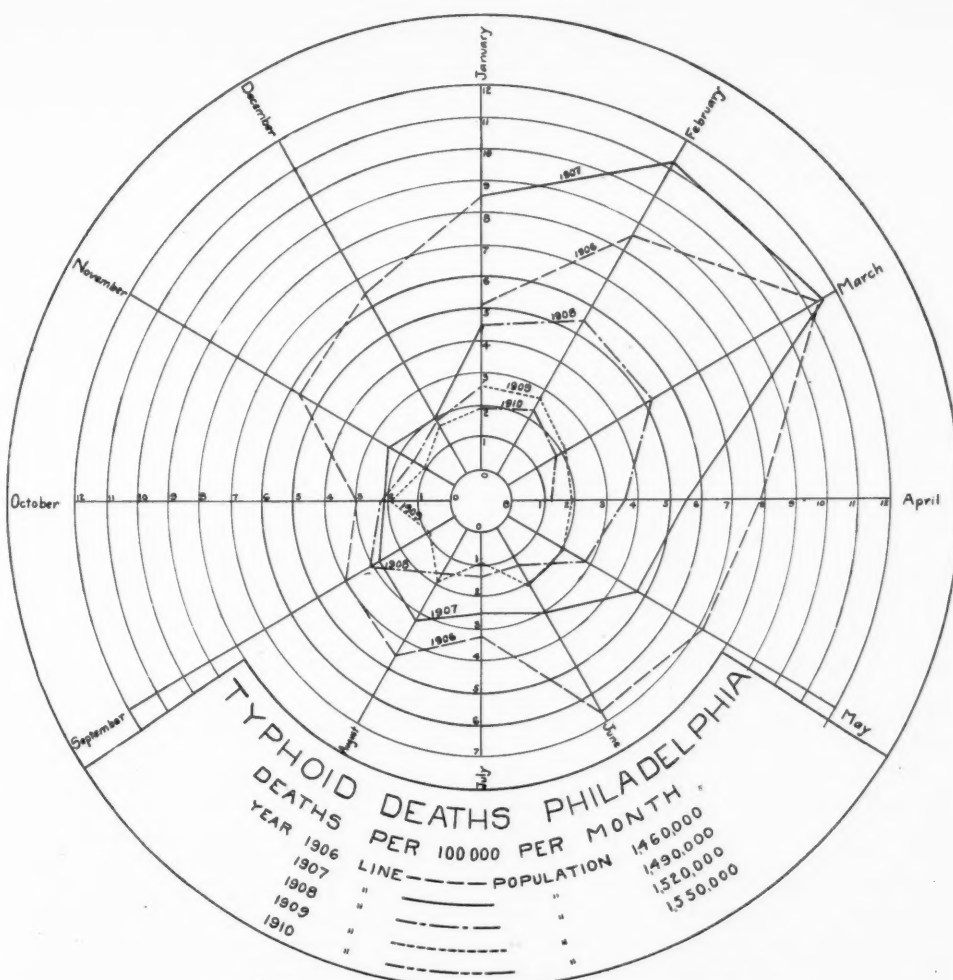


FIG. 2. DEATHS PER 100,000 PER MONTH FOR FOUR YEARS

preliminary filtration. For a period of 40 consecutive weeks—March 7 to December 12, 1909, inclusive—the number of bacteria in the filtered water basin at Torresdale was less than 100 per cubic centimeter and averaged about 30. *B. coli communis* was detected in 10 cubic centimeter samples at rare intervals, and this in spite of the fact that the organism was practically always present in the raw water in one cubic centimeter and usually present in one-tenth.

At present Torresdale filters 220,000,000 to 230,000,000 gallons a day. Belmont filters 35,000,000 and the two Roxboro plants combined about 25,000,000.

In 1907 the deaths numbered 888, a reduction of 173 in spite of the bad start (see Fig. 2). In 1908 the deaths were 533 and in 1909 331. The rate per 100,000 for 1906 was 72.6, for 1907 59.7 and for 1908 and 1909 35.0 and 21.3, respectively.

During the first two months of 1909 Torresdale filtered but 110,000,000 gallons a day, and in order to get the correct annual rate since filtered water was supplied to the entire city, we should take a year beginning with April, 1909. Starting with this date, and including the first three months of 1910, we have a rate of but 19.7. New York for the years 1900 to 1907, inclusive, had a rate of 18. Boston a rate of 21, Brooklyn a rate of 22, Chicago a rate of 25 and Philadelphia a rate of 52. Taking this average figure of 52, we have saved 32 lives per 100,000 per annum, or, taking the population as 1,600,000, 512 in one year. Assuming each life to be worth \$10,000 (see George C. Whipple, "Typhoid Fever") this would amount to \$5,120,000 per annum.

ASSESSING FOR WATER PIPE EXTENSIONS

In connection with the laying of extensions of the water distribution system the city of Tacoma, Wash., creates what is known as "local improvement districts." When a certain number of taxpayers petition the Water Department for the extension of water service to their properties the department examines the contiguous territory and decides what sizes of pipe it is advisable to use and also fixes upon the proper location of hydrants and valves. It also ascertains the assessed value of the property which will be benefited and whether one-half of the above assessed value will cover the assessed cost of the improvement of the district which he contemplates, the assessed cost being based on that of 6-inch pipe throughout. If this investigation is satisfactory, it presents a resolution to Council creating a local improvement district, in which resolution it names the streets upon which the pipe will be laid, the size of pipe and the estimated cost of the same. This resolution is printed in the newspapers for five days, after which during a period of 15 days any remonstrance may be made by those supposed to be benefited. If there is no remonstrance the City Attorney draws an ordinance embracing the resolution and orders the superintendent to advertise for bids covering the district. These bids are advertised for a period of five days and are invariably let to the lowest responsible bidder.

The city of Tacoma lays nothing less than 6-inch water pipe and the value of such a pipe is made the basis of assessment, whatever may be the size of the pipe actually laid. The difference between this and the actual cost is paid for either from the water funds or the general funds of the city. All valves, hydrants and fittings are assessed against the property, although lately the city has decided that the general fund should stand the cost of hydrants. The cost of pipe at street intersections is distributed throughout the improvement district.

Cast-iron pipe is used in all cases, and it is unusual to leave a dead end, although in some cases where there are steep bluffs this is unavoidable.

The payment by the property owners of the assessments above referred to are scattered over a period of seven years if the taxpayers so desire. For the above information we are indebted to Mr. H. A. Whitney, who was Superintendent of the Water Department until that position was abolished by the new commission.

CLARIFYING SEWAGE

Quantity of Organic Matter Removed by Screens and Grit Tanks—Figures from Several Cities—Various Appliances Used

From Report by Emil Kuichling to City of Rochester, N. Y.

By passing crude sewage through gratings or sieves, a quantity of floating and suspended organic matter is removed which varies with the size of the openings. In most cases such screens have been applied mainly to prevent injury or stoppage of pumping machinery, for which purpose a grating formed of bars spaced about one inch apart is generally sufficient. Latterly, however, it has been found very desirable to remove as much of the floating and suspended matter as practicable by means of much finer gratings or screens, since a large proportion of this matter is stable or slowly putrescible and tends to accumulate in the interstices of costly filters, whence it must be removed periodically at large expense. The modern process of purifying sewage may, therefore, be said to consist essentially of two distinct stages, the first being the removal of the suspended matter, while the second is the oxidation of the putrescible organic matter in solution.

In general, it may be said that the suspended matter imparts to sewage its offensive appearance and causes the serious complaints about the pollution of natural water courses. The quantity of such matter contained in sewage varies widely in different places, and also at different seasons, days and hours in the same place.

The quantity of suspended matter that can be removed from sewage by screening has usually been regarded as insignificant, owing to the relatively large width of the spaces between the bars of the gratings ordinarily used. Thus, at the sewage pumping station at Providence, R. I., the matter collected on a grating whose bars are one inch apart was at the rate of 41 pounds per million gallons in 1906; at the Dorchester sewage pumping station in Boston such rate was 300 pounds in 1897, with a similar spacing; at the sewage pumping stations of the South Metropolitan systems, with the grating bars spaced 0.75 inch apart, the average rate during the four years 1905-1908 was 5.4 cubic feet, or about 324 pounds; at the Northern Outfall works of the London sewers, it was 243 pounds with a similar grating in 1897; at the various sewage pumping stations of the Berlin sewerage system, the rate in 1900 was 212 pounds with bars spaced 0.6 inch apart; and at Charlottenburg it was about 200 pounds in 1902. It should be noted that in some cases the figures were given in cubic feet instead of pounds, and that much depends on the extent to which the screenings are drained before being weighed.

In general, it is found that with the usual coarse gratings at sewage pumping stations, the quantity of suspended matter arrested is from 3 to 10 cubic feet per million gallons, and that such matter in its wet state ranges in weight from 20 to 65 pounds per cubic foot. On being completely dried, it loses from 50 to 75 per cent of its weight, so that on the average it can be assumed that such coarse screening removes about 104 pounds of dried matter per million gallons, or about 12.5 parts by weight per million. Most of this matter is organic and more or less quickly putrescible in character; and in comparison with the total quantity of dried organic substance found in suspension in the sewage of American cities, it is still very appreciable in magnitude, particularly when its offensiveness is taken into consideration.

The trouble incidental to the handling of sewage sludge and the application of crude sewage to land, gravel and beds of broken stone have gradually led to the endeavor to remove as much of the suspended matter as possible by mechanical means before proceeding with any further treatment. Attention has, therefore, been directed to the development of a satisfactory system of fine screening, whereby sewage purification will be facilitated and rendered less expensive. In 1898 experiments were made at Leeds, England, with zinc plates perforated with

$\frac{1}{8}$ -inch holes, resulting in obtaining a rate of 36 cubic feet of well-drained matter per million U. S. gallons during the day-time. Its weight is not given, but from other observations it can be taken at 30 pounds per cubic foot.

Similar results were obtained at Wiesbaden, Germany, during 1902, by passing the sewage of the entire city through a set of three screens having clear openings of, respectively, 0.60, 0.16 and 0.04 inch. The matter thus collected amounted to 36.6 cubic feet per million gallons on the average. In 1904 the screens were remodeled so as to pass the sewage successively through a set of four screens having openings of 1.60, 0.60, 0.10 and 0.06 inch, from which 52.7 cubic feet of matter per million gallons was obtained on the average. Experiments were also made by Riensch, at Dresden, in 1906 with a large revolving screen of sheet metal perforated with slots 0.08 inch wide, and it is stated that the collection therefrom has averaged 23.07 cubic feet per million gallons during continuous service. This screen is a circular disk 15.1 feet in diameter, which is inclined 15 deg. from the horizontal so as to submerge about half of its surface.

A similar device was introduced in several English cities many years ago by Latham, the disk being about 9 feet in diameter and set vertically. The triangular spaces between the cast-iron spokes were closed with wire cloth having meshes about 0.4 inch square, and the wheel was slowly rotated in an enlarged section of the outlet sewer. At Coventry the collection by such an apparatus was reported to be from 250 to 300 pounds per million gallons. About 12 years ago another style of screen formed of an endless belt of wire-cloth with meshes about 0.25 inch square was invented and erected at a number of other English sewage works. In 1899 a device of this kind extracted suspended solids from the sewage of Sutton at the rate of 1,200 pounds per million gallons, and in 1904 a similar apparatus with meshes 0.4 inch square extracted at Göttingen, Germany, matter at the rate of 336.6 pounds, or 14.7 cubic feet per million gallons. From the last-mentioned figures, the well-drained matter thus collected is found to weigh about 23 pounds per cubic foot.

An interesting experiment was made in 1906 by City Engineer Mezger in a German town of 50,000 inhabitants (probably Bromberg) with a wire-cloth screen having meshes only 0.06 inch square. The whole of the sewage was passed through the apparatus, and the rates of collection were observed hourly, both when the screen was kept stationary and when it was moved like an endless belt in the outlet sewer. When kept stationary the maximum collection in one hour was at the rate of 13,770 pounds per million gallons; during four consecutive hours the rate was 9,514 pounds; during 24 consecutive hours it was 5,007 pounds, and the minimum rate in one hour was 207 pounds per million gallons. When the screen was moved through the sewage at velocities ranging from 0.5 to 2.0 inches per second the collection was about 14 per cent less during the four hours of greatest flow in dry weather. No determinations of the weight of the extracted matter per cubic foot were recorded, as it was found to vary considerably at different hours, and hence only the total weights per hour were given. If, however, it be assumed that the weight of said matter was 23 pounds per cubic foot, as found at Göttingen, then the average quantity during 24 hours would be at the rate of 217.7 cubic feet, or about 8 cubic yards per million gallons.

Other highly instructive observations on the quantity of suspended matter in town sewage that can readily be extracted by fine screens have been made during the past two years at the sewage works of Reading, Pa. The crude sewage is here mostly domestic in character, and contains little admixture of trade wastes and no street washings, as the latter pass through a separate system of drains into the river without any treatment. The screen is a revolving horizontal cylindrical frame, 16 feet long and 6 feet in diameter, covered with brass wire-cloth having meshes about $\frac{1}{40}$ inch square, which is considerably finer than has heretofore been employed for the purpose. The quantity of solid matter thus collected was reported in 1908 as being 18.8 cubic feet per million gallons on the average, but its weight and percentage of contained moisture is not given. On a visit to the plant last year, the writer was informed that the weight of the

screenings, after partial drying in a centrifugal separator, was 1,500 pounds per million gallons. This would make the condensed mass weigh 80 pounds per cubic foot, of which probably 50 per cent is moisture. If these figures are correct, the screen actually removed 750 pounds of fully dried matter per million gallons of sewage, or 90 parts per million by weight out of a total of 215 parts per million of suspended matter contained in the sewage on the average.

A similar reduction to parts of dried substance per million may now be applied to the figures relating to Coventry, Sutton, Göttingen and Bromberg, given above. Assuming that the well-drained screenings contain 75 per cent of moisture, the quantity of fully dried matter extracted per million gallons of sewage will be as follows: At Coventry, 62.5 to 75 pounds; at Sutton, 300 pounds; at Göttingen, 84.2 pounds, and at Bromberg, 1,251.8 pounds. In parts per million by weight these figures correspond, respectively, to 7.5, 9.0, 36.0, 10.1 and 149.9, while at Reading it was estimated at 90.0. For the observations with fine screens at Leeds, Wiesbaden and Dresden a similar reduction to parts per million by weight on the assumption that the wet screenings weigh 30 pounds per cubic foot and contain 75 per cent of moisture, gives, respectively, 270.0, 274.5, 395.2 and 177.8.

During the elaborate investigations of the sewage of Columbus, Ohio, in 1904-5, the liquid examined was passed through a screen having meshes 0.5 inch square, placed in the main outlet sewer parallel with the line of flow to facilitate its cleaning. The report states (p. 21-22) that this screen "never became clogged sufficiently to require attention. Considerable coarse material which passed through this screen was caught by the screens in the screen chamber, necessitating the cleaning of these screens from five to six times each day. About 300 pounds or 0.17 cubic yard of wet screenings were thus removed on an average per million gallons of sewage." On page 59 of said report these screens are described as being two in number, set vertically near the outlet end of the chamber, and formed of "diamond mesh wire-cloth woven with No. 12 wire. The first screen had a clear opening of 0.5 inch and the second of 0.375 inch." From these data, the wet screenings amounted to 4.6 cubic feet per million gallons and weighed 65.4 pounds per cubic foot.

Their content of moisture is not given, but assuming the same at 75 per cent, the screenings will represent the removal of 9.0 parts per million of fully dried matter, mostly organic and offensive in character. It must also be remembered that these figures relate to the remainder left after preliminary screening, and do not indicate the proportion that would be removed if the entire volume of sewage had passed through a screen with meshes $\frac{3}{8}$ inch square.

It is also of interest to ascertain the nature of the solid matter in crude sewage that is arrested on screens having different sizes of mesh. The most careful analysis of this kind was made by Dr. Monti in 1901 with the sewage of two densely populated districts of Berlin (Radial Systems V and VII), using the liquid that had passed through the detritus tanks and gratings at the two sewage pumping stations. The bars of these gratings were spaced 0.6 inch apart, but the quantity of matter removed thereby during his investigation was not determined. The municipal reports for 1900 give the aggregate amount removed during the year by the gratings at all of the 13 stations, together with the pumpage, and from these figures an average of 10.62 cubic feet of wet screenings per million gallons is deduced. This matter weighed 20 pounds per cubic foot and contained 56 per cent of moisture on the average. By reducing to fully dried substance, the proportions are 93.5 pounds per million gallons, or 11.2 parts by weight per million. It can also be presumed that these figures would be at least doubled for the most populous districts.

As already stated, Monti dealt only with the screened and partly settled sewage. After mixing together samples taken at different depths in the pump well, he caused the liquid to pass through a series of five wire-cloth sieves having meshes, respectively, 7, 4, 2, 1 and 0.5 millimeter wide (or approximately 0.28, 0.16, 0.08, 0.04 and 0.02 inch square), and also determined

the total suspended matter by filtration. He found that on the average his series of sieves extracted only 13.3 per cent of the total dry suspended matter at the first pumping station and 14.0 per cent at the second, the proportions previously removed by detritus tank and grating not being considered. As to the character of the material caught on his sieves the following brief notes are submitted:

The 7-mm. sieve (0.28-inch) caught mainly fecal matter, and large fragments of paper, cloth, vegetables, leaves, wood, etc.

The 4 and 2-mm. sieves (0.16 and 0.08-inch) caught mainly smaller fragments of vegetables, leaves, bits of wood, large seeds, etc., or kitchen wastes.

The 1-mm. sieve (0.04-inch) caught mostly pulp-like matter which increased in volume on drying and consisted of vegetable debris, cotton, linen and wool fibers, hair and muscular tissue.

The 0.5-mm. sieve (0.02-inch) caught matter of the same character as the 1-mm. sieve, but of finer grain.

On drying and weighing the suspended matter caught by the sieves and the filter at the two pumping stations, Monti obtained the following results expressed in parts by weight per million:

At Station V, caught on the fine sieves.....	97
At Station V, remaining on the filter.....	633
At Station V, total suspended matter.....	730
At Station VII, caught on the fine sieves.....	35
At Station VII, remaining on the filter.....	215
At Station VII, total suspended matter.....	250

also the following average and maximum proportions of dried suspended matter caught by each sieve, expressed in percentages of the total thus caught at the two stations, together with the percentages of moisture in the several screenings:

Size of Sieve.	7 mm.	4 mm.	2 mm.	1 mm.	0.5 mm.
Average for both stations.....	43.6	4.0	1.1	9.0	32.0
Maximum for both stations...	68.0	7.0	1.7	14.0	51.0
Per cent moisture.....	75-78	75-80	75-80	85-90	90-95

These data indicate that most of the suspended matter in sewage is usually in a very fine state of division, or capable of passing through a sieve having meshes 0.02 inch square; that most of the solid fecal matter found in the liquid can be arrested on a sieve having meshes 0.25 inch square; and that a sieve with meshes 0.10 inch square is probably fine enough to extract from the sewage all suspended matter of appreciable magnitude, and especially such as is likely to become offensive under the conditions herein proposed for the disposal of the sewage of Rochester. It should also be noted that the method of determining the total quantity of suspended matter by filtration, as adopted by Dr. Monti, often leads to including much gelatinous or colloidal substance which may add considerably to the weight on being dried, and thus tends to reduce the percentage of solid material removed by fine screens. Another significant feature is the apparent slow putrescibility of the pulpy matter caught by the two finest screens.

Many experimenters have found that on transplanting small fragments of solid matter from sewage to a culture medium, a great multitude of bacteria is always carried along. This indicates that these micro-organisms tend to adhere to the suspended matter, and hence that a very appreciable reduction in the number of bacteria in the sewage must result from screening through a sieve having meshes 0.10 inch square.

The data given in the foregoing paragraphs relating to the efficiency of fine screens were obtained only after searching a wide range of scientific literature, as few plants of this character have yet been installed and their performance adequately studied. It is believed, however, that ample evidence has been submitted to show that a surprisingly large quantity of offensive organic matter can be extracted from sewage by properly designed screening appliances, and that the screened liquid may then be admitted safely for final disposal into bodies of water which would soon become repulsive without such screening. It is also obvious that the cost of this operation is much less than that of sedimentation in large tanks, with the attendant difficulties of getting rid of the resulting sludge and no com-

mensurate improvement in the general character of the effluent.

The development of satisfactory screening apparatus for town sewage has led to many new studies of river pollution, especially in Germany. In that country the public health authorities had adopted the conclusion reached by the English Rivers Pollution Commission of 1868, and thought it necessary that sewage should be thoroughly clarified before admitting it into any river. If the sewage was of such character as to remain turbid after settling for several hours in a tank, they required its chemical treatment, especially in the case of water-closeted towns. The result was extremely burdensome, and in many cases it interfered seriously with natural municipal growth. Careful observation was then undertaken of numerous streams which had received for years all municipal and domestic wastes except human excreta, and it was demonstrated conclusively that when the pollution did not exceed certain limits, the water would soon purify itself sufficiently to be available for most industrial purposes, as well as for sustaining the life of fishes and for drinking purposes after being filtered.

It was also proved by exhaustive chemical and bacteriological investigations that the addition of excreta to the said wastes rarely made an appreciable difference in the quality of the river water, and the rapidity with which it recovered from pollution by natural agencies. Further studies have led to the recognition of the character, permanence and efficiency of these agencies, and also to the part played by the suspended matter of sewage. The result of all this work has been to change the old views relating to the contamination of large bodies of water, and to admit that in many cases it is abundantly sufficient to remove from the sewage only the coarser particles of suspended matter, such as will be arrested by screens or sieves of about one-eighth inch mesh. In support of these statements, reference is made to the most recent reports of the German health authorities concerning the sewerage of Dusseldorf, Cologne, Frankfurt, Mannheim, Wiesbaden, Hamburg, Bremen, Dresden, Göttingen, etc.

ABUSE OF FIRE HYDRANTS

THE Superintendent of the Water Department of Boston, Mass., in his annual report describes quite graphically the possible results of promiscuous use of fire hydrants. He says:

While upon the subject of hydrants I wish to call your attention to a very serious matter which before long will have to be dealt with in a firm and decisive manner, viz., the abuse of hydrants by careless and ignorant operators. As you no doubt know, hydrants are primarily a fixture for the use of the fire department, and their value as such depends upon their readiness for use, which, in turn, is dependent upon their working order. Now it is an almost hopeless task to keep hydrants in a good mechanical condition while they are being operated by anybody and everybody. Our hydrants, in common with the rest of our fixtures, open to the right or exactly opposite to the direction in which most mechanical devices unscrew. The ignorant operator in his vain endeavor to open to the left applies all kinds of force with the frequent result that before he realizes that he is turning the screw the wrong way it is strained, bent or broken, and the valve packing below is crushed into a useless mass. . . . It can easily be imagined what a serious state of affairs this might cause at the start of a fire. Helpless to stay its progress because of lack of water, the firemen would have to view the development of a conflagration, perhaps. Again, very few of these ignorant and careless men, who act without authority in many cases and without knowledge in every case, understand that there is a waste in the hydrant that will not operate unless a means is provided for the entrance of the air by leaving the nozzles open while the water is draining out of the barrel. . . . Upon shutting off the main valve they immediately close the independent or nozzle valve and thus trap the water in the barrel. It is not difficult to realize how in cold weather a frozen hydrant will result from these conditions, and a frozen hydrant is not a trifling matter in the event of a fire. I am of the opinion that hydrants should be operated exclusively by the Fire and Water Departments, and other departments and contractors should secure their water through other means.

We can not emphasize too strongly the importance of this matter. Water standards or hose connection boxes flush with the sidewalk, or some other contrivance by which carts can be filled and streets flushed, should be provided in every city.

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JUNE 1, 1910.

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Sand Filtration In Philadelphia

WE are glad to be able to present on another page a statement concerning the results accomplished by the sand filters of Philadelphia's water supply, by the chemist in charge, who gives exact figures of the death rate in the city as a whole and also in the districts served by the several filter plants. There have appeared in the Philadelphia papers from time to time statements, the purport of which has been that the money spent on the Philadelphia filters was thrown away and that the water is no less dangerous now than before their construction. If the figures given by Mr. West in his article are to be relied upon, and there would seem to be no reason for believing that they are not, the death rate has been reduced 70 per cent in the three years since the Torresdale plant began delivering about one-third its capacity of filtered water. Previous to 1908 the annual death rate in Philadelphia had been below 40 per 100,000 but

five times in 40 years. In 1909 the rate was but 21.3; and if we take the average of the twelve months previous to May of this year, the rate has reached the low point of 19.7, which is less than one-half of the lowest rate ever before reached in the city. This certainly does not bear out the animadversions seen in so many of the local papers and copied throughout the country, and which have perhaps influenced a number of cities against the adoption of filter plants.

The figures for last year and for the previous ten years, which represent the typhoid death rates in those cities of New York State which have filtered supplies, are much less favorable on the whole than the Philadelphia figures. Of the seven cities using the filtered river water but two had a death rate last year of less than 18. Of these the city of Albany, whose slow sand filters were the largest in the country when constructed, still uses a certain amount of unfiltered surface water which is believed to account for much of the typhoid fever in that city. Poughkeepsie's slow sand filter has been described and referred to several times by us. As far as we know, all these cities except Albany use filtered water only. The average death rate in these is appreciably higher than that at Philadelphia. Of the seven cities using filtered surface water three had a death rate last year below 18, and the average for this group would have been much lower but for the high rate at Oneonta, which was 79.6 per 100,000. The lowest of this group is Yonkers, where a part of the supply is obtained unfiltered from storage reservoirs. One interesting indication from the table presented is that water from the Great Lakes is apparently about as free from typhoid as that from wells or springs or from impounding reservoirs.

Municipal Census Statistics

In our issue of April 6 some comments were made upon the Census Reports which are published biennially, giving statistics of cities of over 30,000 inhabitants. In this the statement was made that in an examination of the tables dealing with sewers and street paving errors or mistakes have been found in certain of the figures for fifty cities. A few days ago the editor received a communication from the Director of the Census asking for further particulars concerning these inaccuracies (which were really mistakes rather than inaccuracies in the majority of cases); also stating that he would be pleased to have us print such statement of errors and of correct figures in the MUNICIPAL JOURNAL AND ENGINEER.

The letter from the director and our reply to the same are given below. In connection therewith we are also reprinting two letters received by us in reply to inquiries concerning the figures in the Census Report which appeared to us doubtful. The first is typical of many sent in reply to similar questions which offer no suggestion as to how the mistakes occurred, but simply give corrected figures. The second offers a suggestion as to the source of an incorrect figure, but it is difficult to surmise how the 39.4 came to be placed in the column it is in.

There is every probability that many of these errors are due to carelessness on the part of city officials or of some office assistants to whom the filling out of the blanks was assigned. It seems perfectly certain, however, that many and possibly a majority of the errors have been due to ambiguities in the questions themselves and the insufficiency of the questions to cover conditions existing in many cities. One illustration of this is the classification of all sewers as either "brick," "tile" or "other"; thus taking no account of the many miles of concrete and cement pipe sewers in the country.

May 18, 1910.

Mr. A. Prescott Folwell,
Editor Municipal Journal and Engineer,
239 West Thirty-ninth Street,
New York City.

DEAR SIR: My attention has been called to the recent editorial in your journal relating to the census report of statistics for cities containing over 30,000 inhabitants. I write you principally in reference to your criticism concerning the accuracy of that report. I specially note what you say concerning the errors to be found in the statistics of sewerage and street pave-

ments, and for that matter you mention having discovered gross inaccuracies in fifty cities. I should be pleased to have you give me the names of those cities and a statement of the character of those errors, and the corrected figures. We are interested in improving these statistics. This office recognizes their imperfection, owing to the imperfection of local records, and we have never hesitated to set forth in the text accompanying these tables a statement of the margin of error that accompanies them. Any clear-cut statement of inaccuracies such as you mention will be of value to the Census Office and to the general public in calling attention to the need of better local records, without which perfection can never be attained in the Census statistics nor in local reports. By contributing your exhibit of these inaccuracies with a statement of the correct figures, you will not only be doing the Census a great favor, but will contribute your part to bring about an improvement of the local records of our cities throughout the country. I should be pleased to have you print such statement of errors and of correct figures in your journal. It could not fail to be of great value to the cause of accurate municipal statistics.

In the editorial calling attention to the errors in the report mentioned, you make the following statement: "And we speak advisedly when we say that the editor will guarantee with the aid of two office assistants and two in the field, to collect, tabulate and publish all the data concerning cities published by the Census Bureau, and have the same in printed form, ready for distribution, in less than six months, and probably less than three, from the time of undertaking the task. And they will be more accurate than the Census reports, too."

As this office is now expending much more labor than you mention as the maximum required for collecting and compiling these statistics of cities, I should be pleased to receive from you a statement of the methods which you would follow to secure the results stated. I desire this in order that if the method which you have in mind has not already been tried and found impracticable, that we shall give it a trial.

Thanking you for an early reply to this, which you may answer in the inclosed envelope requiring no postage, I am,

Very truly yours,

E. DANA DURAND,

Director.

May 25, 1910.

Mr. E. Dana Durand,
Director, Bureau of the Census,
Washington, D. C.

DEAR SIR: Your letter of May 18th, referring to a recent editorial in the MUNICIPAL JOURNAL AND ENGINEER discussing certain features of the Census Reports for cities containing over 30,000 inhabitants, has been received and I take pleasure in giving you more detailed information concerning the errors and apparent inconsistencies discovered in certain tables of such reports. I will also be glad to comply with your request that I print a detailed statement of these in this journal. I did not do so in the original article chiefly because of not wishing to give the impression of attempting to "feature" the criticism by devoting undue space to the same.

I am enclosing herewith two lists of cities. Certain figures given in the report for each of these impressed me with doubt as to their correctness and suggested the desirability of further investigation to determine whether any of them were erroneous. They are not given as being necessarily so. It will be seen that the lists contain the names of fifty-six cities. Letters were written to each of these calling attention to the figures given in the tables and asking whether these were correct, and if they were incorrect, whether the writer could suggest in what way the error originated. Officials in the twenty-three cities listed in the shorter of the two tables replied concerning at least one of the groups of figures inquired about, and in other columns of this table are given the corrected figures as supplied by them, with explanations where any were offered. In the majority of cases no suggestion was advanced as to how the error came to be made.

From such suggestions as were made and from those offered by the figures themselves it would appear that most of the errors resulted from a misunderstanding of the questions asked or different interpretations of them in successive reports. For instance, in Springfield, Mass., cement pipe as well as clay pipe were included under the head of "tile" in 1903 and 1907, but were not so included in 1905. In Minneapolis, Minn., the same mistake was made, but cement pipe was included in 1905, but not in either of the other two reports.

As stated in the editorial, no special effort was made to discover errors by other than mere surface indications, and only one method of this kind was employed—the simple one of comparing corresponding figures in three successive reports. In the case of Cambridge, for instance, the figures show a slight increase in the amount of brick sewers between 1903 and 1905, and a decrease in length of 23 miles during the next two

years. Such decrease seems improbable, although not impossible. Similarly, in Lowell, Mass., the figures indicate that the amount of tile sewers increased 21.9 miles between 1903 and 1905, but decreased 9.8 miles in the next two years. This seemed improbable, and the city engineer states that it was not the case, but that the growth was nearly uniform during those four years, as indicated by his corrected figures. All of such cases were not included in the list, as those showing large differences only were sufficient in number for our purpose of endeavoring to discover whether there were really errors, as was suspected.

In a few cases it was found that the apparent inconsistency was not an error, but was due to somewhat unusual conditions. For instance, in Elizabeth, N. J., the decrease in length of granite pavement in 1905 was due to the fact that several miles of such pavement had been covered with an asphalt surface and was considered as an asphalt pavement. Another instance is that of Kansas City, Kan., where the wood pavement was actually reduced in quantity, this being old cedar blocks which were replaced with more modern pavements. One other city, not included in the list, but the figures concerning which were considered doubtful because of other information, offered the same explanation. These three reports were the only ones out of the twenty-four which did not confirm the suspicion of incorrectness.

[An outline was given of the plan which we would probably follow in collecting and preparing the statistics, which it seems best to omit in view of the space which has already been given to this subject.]

Trusting that this supplies with sufficient completeness the information requested by you, I beg to remain,

Yours very truly,

A. PRESCOTT FOLWELL,

Editor.

Possibly Erroneous Data—No Corrections Received

City	Figures for	For the years of		
		1903	1905	1907
Manchester, N. H.	Asphalt pavement	2.4		
Boston, Mass.	Brick sewer	196.0		90.2
Lawrence, Mass.	Gravel pavement		66.4	
Somerville, Mass.	Gravel pavement	0.3	23.6	12.8
Woonsocket, R. I.	Gravel pavement		35.0	36.1
New Britain, Conn.	Macadam	30.0	31.8	20.0
Waterbury, Conn.	Gravel pavement		60.0	60.0
New Haven, Conn.	Brick sewer	41.0	41.4	39.3
	Tile sewer	60.7	48.6	60.3
Auburn, N. Y.	Macadam pavement	43.3	20.0	30.0
Utica, N. Y.	Cobble pavement	2.1	0.2	0.8
Paterson, N. J.	Brick pavement	5.9	7.8	6.5
	Brick sewer	20.0	15.0	15.0
Chester, Pa.	Brick sewer	26.7	22.0	22.0
Erie, Pa.	Granite pavement	4.8		
Pittsburg, Pa.	Granite pavement	142.4	201.0	216.4
Wheeling, W. Va.	Brick sewer	3.5	7.0	2.9
Mobile, Ala.	Wood pavement	2.0	0.9	1.6
Fort Worth, Tex.	Macadam pavement	80.0		
San Antonio, Tex.	Gravel pavement		104.0	104.0
Toledo, O.	Wood pavement	10.0	6.5	6.1
Evansville, Ind.	Brick pavement	25.5	23.0	26.2
Chicago, Ill.	Wood pavement	665.2	581.0	493.8
Peoria, Ill.	Macadam pavement	1.0	1.0	21.0
Springfield, Ill.	Brick sewer	44.7	46.5	37.8
Bay City, Mich.	Wood pavement	28.7	11.8	14.8
Detroit, Mich.	Wood pavement	235.4	220.7	211.8
Grand Rapids, Mich.	Wood pavement	8.7	4.2	2.9
Saginaw, Mich.	Cobblestone pavement	4.7	3.2	3.5
Duluth, Minn.	Wood pavement	20.1	20.9	11.7
Omaha, Neb.	Wood pavement	11.4	8.0	7.4
Denver, Col.	Granite pavement	2.7		5.0
	Brick sewer	23.3	54.3	28.6
Butte, Mont.	Tile sewer	19.7	26.0	0.2
Portland, Ore.	Brick sewer	13.5	16.2	13.5
Oakland, Cal.	Asphalt pavement			13.8
	Bituminous macadam		10.1	

OFFICE OF THE CITY ENGINEER

COMMISSIONER OF THE DISTRICT OF COLUMBIA,

WASHINGTON, March 15, 1910.

MUNICIPAL JOURNAL AND ENGINEER,

Mr. A. Prescott Folwell, Editor,

New York City.

DEAR SIR: Referring to your communication of the 9th instant addressed to "The Engineer of Highways," and to that part of it referring to sewers, and the census figures in the years 1903, 1905, and 1907, respectively, giving the length of trunk sewers, I would state that these figures should be 96.3 miles, 103.2 miles and 112.2 miles, instead of the figures as quoted by you.

The above were taken from the annual reports for the several years mentioned. I am forwarding under separate cover a copy of my last annual report of the operations of the Sewer Division, Engineer Department, D. C., for your information.

Very truly yours,

ASA E. PHILLIPS,

Superintendent, Sewer Department, D. C.

Possible Erroneous Data, with Corrections Furnished by City Officials

CITY	Figures For	FOR THE YEARS OF			CORRECTED FIGURES		
		1903	1905	1907	1903	1905	1907
Cambridge, Mass.	Brick sewer.	70.8	71.8	48.6	.....	.....	48.6
Lowell, Mass.	Brick sewer.	30.1	13.7	32.0	.....	.....	.....
"	Tile sewer.	57.0	78.9	69.1	.....	64.4	69.1
Salem, "	Gravel pavement.	38.4	40.9	24.0	.....	.....	.....
"	Tile sewer.	35.8	35.8	29.0	Probably	incorrect	29.0
Springfield, Mass.	Tile sewer.	73.5	51.7	81.9	73.5	77.05 ^a	81.9
Bridgeport, Conn.	Wood pavement.	.....	21.6	0.5	.....	None	0.5
Schenectady, N. Y.	Asphalt pavement.	17.5	24.3	28.7	.....	22.2	.....
Elizabeth, N. J.	Granite pavement.	17.7	14.8	20.3	.....	^b	.....
Hoboken, N. J.	Granite pavement.	16.2	23.4	16.6	.....	^c	.....
Allentown, Pa.	Brick pavement.	0.4	0.2	0.3	.....	^d	.....
New Castle, Pa.	Tile sewer.	45.0	43.5	5.0 ^e	.....	.....	51.46
Washington, D. C.	Asphalt pavement.	157.3	163.5	169.8	.....	.....	164.52
"	Brick sewer.	99.1	109.1	86.6	96.3	103.2	112.2
Charleston, S. C.	Tile sewer.	34.1	41.4	39.4 ^f	.....	.....	41.4
Savannah, Ga.	Brick sewer.	12.6 ^g	12.6 ^g	2.3 ^g	.....	.....	.....
Minneapolis, Minn.	Wood pavement.	46.4	34.2 ^o	34.8	.....	.....	.....
"	Cobble pavement.	.....	.....	19.7	.....	.....	.....
"	Granite pavement.	21.9	31.1 ^o	16.3	.....	.....	.....
"	Tile sewer.	45.6	92.9	80.5	.....	.....	112.9 ^h
Milwaukee, Wis.	Wood pavement.	41.1	34.5	29.4	.....	.....	.....
"	Cobble pavement.	74.5	.....	.....	.....	.....	.....
"	Granite pavement.	9.0	88.5	97.7	.....	9.7	10.9
Louisville, Ky.	Granite pavement.	41.0	47.5	17.6	17.6	17.5	17.6
"	Brick pavement.	63.5	69.0	84.2	40.0	49.1	53.6
"	Tile sewer.	50.6	64.8	59.7	.....	51.3	.....
Kansas City, Kan.	Wood pavement.	3.5	1.5	1.4	.....	^k	^k
Wichita, Kan.	Asphalt pavement.	4.6	.....	5.8	.....	4.6	.....
St. Joseph, Mo.	Brick sewer.	9.7	0.4	0.4	.....	9.7	9.7
St. Louis, Mo.	Granite pavement.	141.0	71.7 ^l	142.2	.....	.....	.....
"	Brick pavement.	89.5	137.0	209.6	.....	.....	.....
Houston, Tex.	Tile sewer.	31.7	47.0	40.0	.....	.....	55.5
Pueblo, Col.	Brick sewer.	57.3	4.5	4.0	.....	.....	.....
"	Tile sewer.	.....	106.6 ^m	76.5	.....	.....	.....
Spokane, Wash.	Asphalt pavement.	8.8	3.6 ⁿ	7.5 ⁿ	.....	.....	.....

^a Clay pipe, 51.7; cement pipe, 25.4.

^b Stone pavement covered with asphalt in 1907.

^c 23.4 was approximately all the pavement in the city in 1905.

^d One figure includes street railway right of way, other does not.

^e There are about 5 miles of storm sewers.

^f 3.94 miles of discontinued sewer apparently the basis of this figure. See letter.

^g 12.6 miles is total mileage of combined system; 2.3 is house sewers.

^h 80.5 miles clay pipe, 32.4 of cement.

ⁱ None in streets; these probably alleys.

^j Cedar block; replaced with brick and asphalt as they wore out.

^k This does not include alley paving; other figures for granite and brick do.

^l Reported incorrect; correct figure not given.

^m No asphalt has been put out of commission, but some has passed out of guarantee.

ⁿ Estimated.

CHARLESTON, S. C., Jan. 28th, 1910.

Mr. A. Prescott Folwell, Editor,
MUNICIPAL JOURNAL,
231 West Thirty-ninth Street,
New York City.

DEAR SIR: Your inquiry 26th to hand concerning apparent inconsistency in the Census Reports on the subject of our tile sewers. In 1895, I think, the city commenced a sewerage system, but after building 3.94 miles discontinued the construction until such time as the water supply question could be settled. This unfinished sewerage system is entirely distinct from our drainage system, which comprises about 23½ miles of brick drains and about 41.4 miles of terra cotta drains. Comparing these figures with those which you quote from the Census reports, I judge that the drains and sewers have become mixed, and that the 39.4 miles mentioned by you is intended for 3.94 miles of sanitary sewers, the 41.4 miles mentioned representing the terra cotta drains.

Yours very truly,

J. H. DINGLE,
City Engineer.

CALCULATING METER ERRORS

In testing meters it is common practice to express the error made by the meter in registering flow as a percentage of the total amount. The calculation of such percentage is tedious and the liability of error is considerable; moreover some employees who make meter tests have not the ability to make such calculations with any certainty. The testing machines made by Mueller Brothers, and possibly others, have attached a scale so graduated that the moving of a weight on the scale beam to balance the water which has passed through the meter indicates the percentage of error without any calculation. Mr. Erman N. Peck, Superintendent of Water Works of Hartford, Conn., has prepared a number of tables from which can be read off at once the percentage of error of a meter, these being prepared for meters which read in cubic feet, the scales weighing the measured water in pounds. The series of tables comprises one to cover the condition of the meter registering one-half cubic foot, one cubic foot, two, etc., up to 20. We reproduce herewith Mr. Peck's table to be used when the meter registers to cubic feet. For one cubic foot, place a decimal point before the last figure indicating pounds; for five cubic feet divide the number representing pounds by two, etc. In

this way tables can readily be prepared for any number of cubic feet. The method of using the table is very simple. Should the meter register 10 cubic feet and the scales indicate that the amount of water passed by the meter weighs 692 pounds, we see that the meter is registered 90.3 per cent of

Meter Registers 10 Cubic Feet

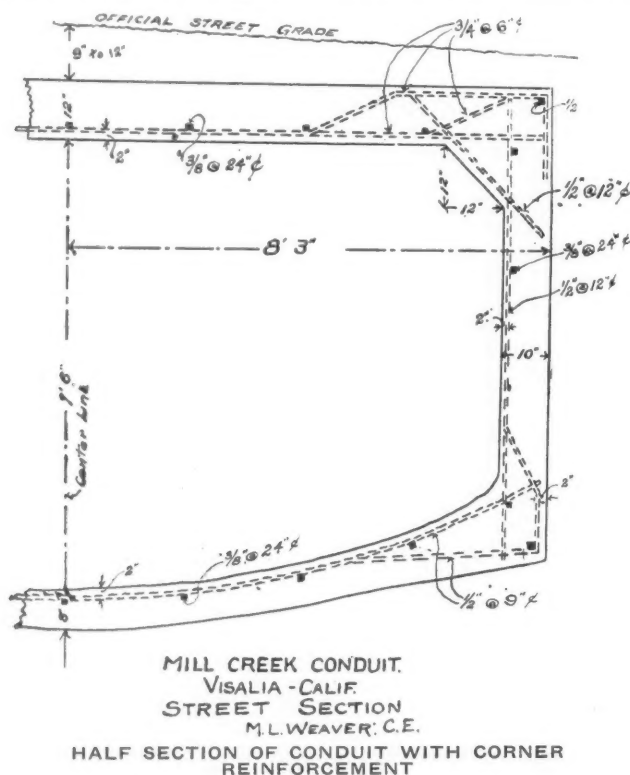
Pounds	Per Cent.	Pounds	Per Cent.	Pounds	Per Cent.	Pounds	Per Cent.
550	113.6	599	104.3	647	96.6	740	84.5
551	113.4	600	104.2	648	96.5	742	84.2
552	113.2	601	104.0	649	96.3	744	84.0
553	113.0	602	103.8	650	96.2	746	83.8
554	112.8	603	103.6	652	95.9	748	83.6
555	112.6	604	103.5	654	95.6	750	83.3
556	112.4	605	103.3	656	95.3	752	83.1
557	112.2	606	103.1	658	95.0	754	82.9
558	112.0	607	103.0	660	94.7	756	82.7
559	111.8	608	102.8	662	94.4	758	82.5
560	111.6	609	102.6	664	94.1	760	82.2
561	111.4	610	102.5	666	93.8	762	82.0
562	111.2	611	102.3	668	93.6	764	81.8
563	111.0	612	102.1	670	93.3	766	81.6
564	110.8	613	102.0	672	93.0	768	81.4
565	110.6	614	101.8	674	92.7	770	81.2
566	110.4	615	101.6	676	92.5	772	81.0
567	110.2	616	101.5	678	92.2	774	80.8
568	110.0	617	101.3	680	91.9	776	80.5
569	109.8	618	101.1	682	91.6	778	80.3
570	109.7	619	101.0	684	91.4	780	80.1
571	109.5	620	100.8	686	91.1	782	79.9
572	109.3	621	100.6	688	90.8	784	79.7
573	109.1	622	100.5	690	90.6	786	79.5
574	108.9	623	100.3	692	90.3	788	79.3
575	108.7	624	100.2	694	90.1	790	79.1
576	108.5	625	100.0	696	89.8	792	78.9
577	108.3	626	99.8	698	89.5	794	78.7
578	108.1	627	99.7	700	89.3	796	78.5
579	107.9	628	99.5	702	89.0	798	78.3
580	107.8	629	99.4	704	88.8	800	78.1
581	107.6	630	99.2	706	88.5	802	77.9
582	107.4	631	99.1	708	88.3	804	77.7
583	107.2	632	98.9	710	88.0	806	77.5
584	107.0	633	98.7	712	87.8	808	77.4
585	106.8	634	98.6	714	87.5	810	77.2
586	106.7	635	98.4	716	87.2	812	77.0
587	106.5	636	98.3	718	87.0	814	76.8
588	106.3	637	98.1	720	86.8	816	76.6
589	106.1	638	98.0	722	86.6	818	76.4
590	105.9	639	97.8	724	86.3	820	76.2
591	105.8	640	97.7	726	86.1	822	76.0
592	105.6	641	97.5	728	85.8	824	75.8
593	105.4	642	97.4	730	85.6	826	75.7
594	105.2	643	97.2	732	85.4	828	75.5
595	105.0	644	97.0	734	85.2	830	75.3
596	104.9	645	96.9	736	84.9	832	75.1
597	104.7	646	96.8	738	84.7	834	74.9
598	104.5						

the full amount, or with an error of 9.7 per cent. This table covers practically the entire range from an over registration of 13.6 per cent to an under registration of 25 per cent. For weights intermediate between the values given the percentage can readily be interpolated.

REINFORCED CONCRETE CORNERS

SEVERAL structures which we have inspected recently have called to our attention the importance of paying more attention to the angles and corners of concrete structures than is frequently done. This is especially the case where there is a change in the thickness, form or conditions to which the two parts of the structure which meet at such an angle are subjected. An angle of 90 degrees or less is an invitation for a crack to begin at that point, whereas a round surface will frequently prevent a crack from spreading. An illustration of the last statement is found in the fact that a crack in an iron or steel plate may sometimes be stopped from extending further by drilling a round hole at or just beyond the extreme limit of the crack.

The above would suggest that junctions between the side walls of tanks, reservoirs, etc., and between the sides and either top or bottom of a sewer or conduit should be made with rounded rather than with square corners; also that additional reinforcement be placed at such intersections to resist any tendency to cracking apart. An illustration of both of these is found in a recent design for a sewer or creek conduit to be



constructed at Visalia, Cal., made by Mr. M. L. Weaver, the city engineer. The section shown here, which will be about 860 feet long, is intended to carry the street traffic with a cover of only 9 to 12 inches above the roof. The most of the conduit, however, will be off the highway and in this section the construction will be lighter. In this plan it is seen that the top intersection is made with two 120° angles rather than one 90°. In our opinion a quadrant of a circle would be still better than this.

TACOMA'S MUNICIPAL PERIODICAL

A NUMBER of more or less pretentious bulletins recording the doings of municipal departments are published by the officials of several cities throughout the country, but as far as we know Tacoma is the first city to provide in its charter for the publication of such a bulletin. According to a local paper, the new

commissioners will find themselves required by the commission plan charter to print and distribute each month a pamphlet giving information as to the work of the several departments. Without pretending to express our opinion as to the advisability of requiring such a publication by city charter, we are glad to see that formal recognition is given to the value and importance of informing the people regularly and promptly of what its government is doing.

PROPOSED SIDEWALK ORDINANCE

Through the courtesy of Mr. Thos. W. Fleming, member of the City Council of Cleveland, we present herewith a copy of the ordinance introduced by him and referred to in our issue of May 11; omitting only such sections and parts of sections as are due to local conditions or existing laws.

No person, partnership, firm or corporation shall store, pile, deposit, place or cause or permit to be stored, piled, deposited or placed upon any sidewalk in said city any rubbish, wood, coal, boxes, barrels, stone, brick, lumber, merchandise, shipping cases, stands, signs, dirt or other obstructions of any kind, except as hereinafter provided.

Any person, partnership, firm or corporation doing business within the following district: (Here follows a description of the main business district.) may place and maintain a permanent show-case or show-cases for the display of goods, wares and merchandise sold by them, as provided for in Section 998 of Part 3 of the Building Code of the City of Cleveland; nothing in this Section or Ordinance shall be construed to prevent the moving of goods, wares or merchandise across any sidewalk in the way of trade, or for the use of families, and, provided further, that none of the terms of this Ordinance shall be construed to permit merchandise, goods, shipping cases or other material on any sidewalk at night, on Sundays, on Legal Holidays or any time when the person, firm or corporation, owning or controlling the property fronting on said sidewalk shall have closed its place of business or shall have ceased the actual work of shipping or receiving said merchandise, goods, shipping cases or other material.

In any part of the City of Cleveland not lying within the district bounded and described, any person, partnership, firm or corporation shall be allowed to occupy with the goods, wares and merchandise sold or manufactured by them 18 inches of the inside of the sidewalk space where said sidewalk space is 8 feet or less in width; 20 inches of the inside of the sidewalk space where said sidewalk space is over 8 feet and less than 10 feet in width; and 3 feet of the inside of the sidewalk space where said sidewalk space is 10 feet or more in width; provided, that all such articles so displayed which are intended for human consumption shall be displayed on sale-stands at least 2 feet above the sidewalk, and all such stands must be so erected that said goods will be protected or covered with wire netting, glass case or cloth enclosing the same, and said space shall not be used for the display of any goods, wares or merchandise, nor shall said sale stands be permitted to occupy the sidewalk before 6 o'clock a. m. or after 6 o'clock p. m. of any day, and no space of any sidewalk shall be used or occupied for any purpose described in this section on Sundays or Legal Holidays.

Any person, partnership, firm or corporation engaged in the business of horse shoeing, blacksmithing, or in the manufacture or repair of wagons, buggies or other vehicles, may secure from the Director of Public Service, under proper regulations and restrictions to be by him from time to time made, the privilege of using any sidewalk for the purpose of placing vehicles undergoing immediate repairs or vehicles from which horses have been unhitched for the purpose of being shod; provided, that at all times a space of 10 feet in width along that portion of the sidewalk which is paved shall be left clear and unobstructed.

Any person, partnership, firm or corporation may place and maintain upon any sidewalk in the City of Cleveland between the hours of 5 a. m. and 7 p. m. of any day, a sign not to exceed 4 feet in height, 2½ feet in width and 3 inches in thickness, which sign shall be securely fastened to the building.

The provisions of this Ordinance shall in no way apply to that part of the City of Cleveland described in those sections of the Revised Ordinances defining market districts, nor to the placing and maintaining of barber poles on the sidewalks of the City of Cleveland, which shall be regulated in accordance with Section 1031, Part 3, of the Building Code; nor shall the provisions of this Ordinance be construed as repealing or modifying any provisions of the Building Code regulating the use of sidewalks in connection with building operations.

Whoever violates the provisions of this Ordinance shall upon conviction thereof be fined in any sum not less than \$10 nor more than \$25 for each offense.

TYPHOID RATES IN NEW YORK

THE New York State Board of Health has published a table giving the death rates during 1909 and also for the last 10 years in the several cities of the State, these being arranged in six classes—those using unfiltered lake water, unfiltered river water, filtered river water, well or spring water, water from streams and reservoirs, and filtered surface water. The death rates of the various cities in each of these classes vary considerably, the lowest for the 10 years being Yonkers, N. Y., where the rate was 9.5, and the highest being Niagara Falls, where the rate was 129.1.

Averaging the rates for all the cities in each group, we find that in both 1909 and the 10 years ending with that year, the least typhoid mortality was found in cities using water from streams and reservoirs; the next lowest in cities using unfiltered lake water, and the highest rate was in cities using unfiltered river water. In the 10-year average rates the cities using filtered surface water occupy third place, followed by those using well or spring water, and after these, those using filtered river water. The 1909 rate places those using well or spring water

third, those using filtered river water fourth and those using filtered surface water fifth.

This arrangement appears to indicate conditions differing from what would ordinarily be expected, especially in that filtered river water gave rates but little lower than the unfiltered river water and considerably higher than unfiltered lake water. Unfiltered water from streams and reservoirs and unfiltered lake water appear to have resulted in less typhoid than filtered water of any kind. It must, of course, be borne in mind—and this probably is the answer to the apparent inconsistencies—that the only proper comparisons are those made between a given city before and after purifying its water. It is probable that those cities which have adopted filtration had originally an unusually dangerous water supply; and although their present conditions compare unfavorably with those cities which are blessed with naturally pure water, the filters may actually have greatly improved the conditions which would otherwise exist. In spite of this, however, the showing for filtered water in New York State would seem to be very poor and to give rise to the suspicion that sufficient care was not being taken by most of the cities in careful and scientific operation of their filters.

Typhoid Death Rates in Cities of New York State

CITY	Average Rate per 100,000 for 10 Years	1909		Source of Water Supply
		Total Deaths	Death Rate per 100,000	
<i>Cities using unfiltered lake water:</i>				
Auburn.....	22.5	6	17.5	Owasco lake.
Buffalo.....	27.0	12	24.2	Lake Erie.
Dunkirk.....	39.5	2	11.1	Lake Erie.
Geneva.....	25.8	2	14.7	Seneca lake.
Syracuse.....	14.8	14	11.1	Skaneateles lake.
Average.....	25.9		15.7	
<i>Cities using unfiltered river water:</i>				
Cohoes.....	83.8	20	82.2	Mohawk river. (Mechanical water filter being installed.)
Lockport.....	51.5	9	49.7	Erie Canal. New supply being used recently from the Niagara river at North Tonawanda.
Niagara Falls.....	129.1	24	74.9	Niagara river. Water supplied to one part of the town is partly filtered.
North Tonawanda.....	34.1	6	55.6	Niagara river.
Ogdensburg.....	48.5	4	26.8	Oswegatchie river.
Oswego.....	49.8	6	26.6	Oswego river.
Rome.....	21.7	3	16.0	Mohawk river until Nov., 1909; since then Fish creek.
Tonawanda.....	31.5	2	27.3	Niagara river.
Average.....	56.2		44.9	
<i>Cities using filtered river water:</i>				
Albany.....	21.9	19	18.8	Hudson river. Filtered since September, 1899; also some unfiltered surface water. (Slow sand filtration.)
Binghamton.....	20.9	6	13.1	Susquehanna river. Filtered since June, 1902. (Mechanical filtration.)
Elmira.....	41.0	12	33.5	Chemung river and storage reservoir on Hoffman creek; all water is filtered since 1896. (Mechanical filters.)
Poughkeepsie.....	46.3	6	23.0	Hudson river. Filtered. Plant improved fall of 1907. (Slow sand filter.)
Rensselaer.....	54.2	4	29.9	Hudson river. Filtered since 1902. (Mechanical sand strainer.)
Watertown.....	67.2	11	39.0	Black river. Filtered since October, 1904. (Mechanical filter.)
Watervliet.....	47.6	1	6.8	Mohawk river. Filtered. (Sand strainer.)
Average.....	42.7		23.4	
<i>Cities using well or spring water:</i>				
Corning.....	44.9	19	12.3	Springs.
Cortland.....	26.0	3	23.9	Springs.
Fulton.....	30.7	0	0	Wells and springs.
Ithaca.....	52.8	3	19.2	Six Mile creek. Unfiltered until epidemic in 1903. Since then a filter has been used or water has been taken from deep wells and springs.
Olean.....	18.5	2	11.1	Driven wells.
Jamestown.....	26.6	5	17.5	Artesian wells.
Schenectady.....	22.4	8	10.9	Large wells. Use of Mohawk river discontinued 1903.
Average.....	31.7		15.8	
<i>Cities using water from streams and reservoirs:</i>				
Amsterdam.....	18.6	3	11.9	Creeks with large reservoirs.
Glens Falls.....	35.7	1	6.1	Surface streams and storage reservoir.
Gloversville.....	19.4	2	10.7	Streams and storage reservoirs.
Johnstown.....	17.1	0	0	Springs and streams.
Newburgh.....	39.5	12	47.4	Small streams and storage reservoir.
New Rochelle.....	22.8	6	24.1	Surface streams and storage reservoirs. Small quantity from wells at times.
Plattsburg.....	21.2	3	26.2	Surface streams and reservoirs.
Rochester.....	13.7	17	8.6	Hemlock lake and tributaries.
Troy.....	44.9	17	22.0	Small lakes and streams. Partial use of Hudson river discontinued May, 1906.
Utica.....	17.3	11	15.8	Small surface streams.
Port Jervis.....	43.6	2	20.1	Surface ponds and streams.
New York (Greater).....	17.0	564	12.7	The sources of supply for the different boroughs of Greater New York are as follows: Boroughs of Manhattan and the Bronx obtain their water from streams, lakes, ponds, and reservoirs on the Croton, Bronx and Byram watersheds. Borough of Brooklyn, about 60% of the water is underground water or is filtered through artificial filters; the remainder is surface water from streams and storage reservoirs. Borough of Queens water supply is underground water from driven wells. Borough of Richmond obtains underground water from wells. Surface water from two different streams. (Filter abandoned.)
Little Falls.....	34.3	1	8.6	Springs.
Oneida.....	14.5	0	0	
Average.....	25.7		15.3	
<i>Cities using filtered surface water:</i>				
Hornell.....	23.3	3	21.2	Surface water. Filtered since 1899. (Mechanical pressure filter.)
Hudson.....	53.8	1	9.1	Hudson river, filtered prior to February, 1905. Purer small streams filtered since then. (Slow sand filter.)
Kingston.....	19.5	8	30.6	Surface streams and Cooper lake, filtered. (Mechanical filter.)
Middletown.....	24.2	3	18.1	Surface water filtered. (Mechanical gravity and pressure filters.)
Mount Vernon.....	14.8	2	7.2	Surface water filtered. (Mechanical filter and sand strainer.)
Oneonta.....	43.0	7	79.6	Surface water filtered. (Mechanical pressure filters.)
Yonkers.....	9.5	5	6.9	Surface streams and storage reservoirs unfiltered; tube wells and Sawmill river, which is filtered. (Slow sand filtration.)
Average.....	26.9		24.7	

NEWS OF THE MUNICIPALITIES

Current Subjects of General Interest, Under Consideration by City Councils and Department Heads—Streets, Water Works, Lighting and Sanitary Matters—Police and Fire Items—Government and Finance

ROADS AND PAVEMENTS

Maryland Good Roads Commission

Annapolis, Md.—On June 1, the Highway Division, Maryland Geological Survey, will be legislated out of office, their duties being assumed by the new Good Roads Commission.

Asphalt Paving Change Proposed

Bayonne, N. J.—An effort to do away with the five-year clause in the award of contracts for asphalt paving in Bayonne was made at the council meeting by Councilman Daly. The specifications now used provide that no brand of asphalt shall be used that has not proved successful for at least five years. Dr. Daly introduced a resolution providing that the bidding be open hereafter to all responsible bidders. The resolution sets forth that asphalt equally as good as that used in Bayonne has been laid in Brooklyn, Newark, Chicago, Boston, New Orleans, and many other cities at a cost of twenty-five to fifty cents a square yard less than is being paid in Bayonne. Councilman Daly says he cannot see why any asphalt that stands the chemical test should not be used.

Good Roads Association Opposes Good Roads Bill

Sacramento, Cal.—The report of J. M. Eddy, Secretary of the California Good Roads Association, opposing the acceptance of the act of the last legislature, providing for the issuance of \$18,000,000 bonds to build highways, has been approved by the directors of the association. One of the principal objections is that the County of San Francisco is exempt from the payment of interest on the bonds. Eddy also contends that the bill should have some provision to compensate counties which have already constructed good roads by bonding themselves, and that, instead of highways being built as outlined, along waterways and railroads, they should be constructed to open new territory. He declares, also, that the bill is loosely drawn, and that it places upon the Department of Engineering, already overburdened, too much work.

Independent Department of Streets

Chicago, Ill.—The Civic Federation has recommended that the street service of Chicago be given deserved recognition and that an independent department of streets be created. In coming to this conclusion it took counsel with such men as Richard T. Fox, Joseph Downey, William L. O'Connell, and others, who have had practical experience in the public service of Chicago. A letter to Council is in part as follows:

"The administration of Chicago's street affairs, although one of the most important functions in the whole city government, is treated as a matter of subordinate importance. It has been one of the nine bureaus in the cumbersome department of public works. The functions of the street bureau include not only the cleaning of the vast mileage of thoroughfares and the removal of dirt, refuse and garbage (including the removal of snow from the downtown streets), but in addition the general supervision of all public ways, streets and sidewalks alike.

"In addition the street superintendent has the issuance of permits for street openings by public corporations or other branches of the city government, and it is his duty to see that the pavement is replaced in as good condition as when disturbed and that the cost is charged against the proper account. These permits alone run on an average of more than 500 a week. The superintendent of streets also has supervision of the changing of street-railway tracks, and it devolves upon him to see that the street-railway companies do the street sprinkling, cleaning and repairing required of them by ordinance.

"It is absurd to subordinate so essential a part of our municipal administration and then expect an adequate degree of efficiency. Under our present system the man who is nominally in charge of Chicago's street affairs, the superintendent of streets, actually is not in charge. The commissioner of public works, if he so desires, has the power to nullify the orders of the street superintendent."

Bids Rejected on Account of Analysis of Creosote Oil

Cincinnati, Ohio.—The contract for paving Reading road with creosoted wood blocks which has been pending for several months has been awarded to A. J. Henkel & Bros., the highest bidders, at \$262,827. The bids of the Barber Asphalt Company, M. Sullivan & Sons, and the United States Wood Preserving Company were rejected on account of the chemist's report of the sample of creosote oil submitted. Regarding the oil furnished by the last named bidder, Chemist Wehmer says: "I would beg to call particular attention to the analysis of Sample 'A.' This oil is unlike any sample we have ever received from the same parties up to the present. Apparently it meets the specifications in respect to specific gravity, amount of insoluble matter and distillate to 315 deg. C. However, the distillates about 300 deg. C are not what we would expect to find from pure coal tar distillate; they contain a very small amount of anthracene, practically none, and are all liquid at ordinary temperatures, and, furthermore, while distilling these fractions have a pronounced odor of cracked petroleum. The sulphuration test, which ordinarily would show the presence of petroleum compounds, fails in this case, but this test is practically always negative, for the distillates of oil tars above 315 deg. C. As our specifications are drawn up with the express object of obtaining the largest possible amount of anthracene and anthracene oil, and as this sample does not contain the required substances, I have to report that it does not meet the specifications. It was suggested by the chemist representing the manufacturer of this sample, who was present when the sample was tested, that this lack of anthracene, to which his attention was called, was due to the fact that it had been removed and only the residual oils used. If this be the case, it is an additional reason for not accepting the oil, for if the principal substances desired are removed from the oil it is an adulterated product and does not conform to the specifications."

Good and Economical Road Building

Castleton, Kan.—The best example of road building to come to the attention of W. B. Harris, the county engineer, is in Castleton township. The improvement of a length of three and a half miles was made at the cost of \$50 a mile. Another road six miles long in Lincoln township has been built by the same methods and is equally as good. A traction engine with two road graders attached, was run over the road four times and the soil was thoroughly pulverized. The graders were followed by a road drag which dragged the dirt in the holes, thus leaving the road of the same shape from end to end and thoroughly packed. The road was given a crown slope of one inch to each foot allowed for the width of the driveway. Immediately after this a heavy rain fell, then the farmers returned to the road with the drag and went over it until the holes that had been occasioned by the rain in places where the dirt had not packed during the process of grading, were filled and the road was in much better condition than after being dragged before the rain. The rain tended to pack the dirt harder and enable the workers to discover the places where the dirt had not packed during the grading process. The work was done under the direction of R. D. Holderman, the road overseer, who had received plans, specifications, and instructions from Engineer Harris.

Uncertainties of Paving Law Delays Work

Michigan City, Ind.—The Board of Public Works passed a resolution setting forth that the city will do no paving during the year 1910, because of the uncertainty of the paving law. The resolution sets forth that when the next legislature meets it may either amend or repeal the present paving law, which is very ambiguous. The uncertainty in the law has greatly lessened the construction of pavements this year throughout the State.

Expensive Street Widening

London, England.—The beautification of London is slowly but surely proceeding.

Fleet street, impossibly narrow for the amount of traffic daily filtering through it, is to be widened at a cost of \$10,000,000, and old-established tradesmen have already begun to move into temporary premises. Piccadilly is also in the throes of a widening process that will entail an expenditure of even more money than the Fleet street scheme. East of Temple Bar a new bridge is projected in order to relieve the great traffic across Southwark and Blackfriars bridges. There are already ten bridges between the Tower Bridge and the Suspension Bridge at Hammersmith, and the addition of another will almost transfer the River Thames into an arcade. The art world is greatly disturbed for fear the new bridge may prove an eyesore as bad as, or even worse, than many of the Thames' abortions.

Time Consumed by Proceedings to Pave a Street

Racine, Wis.—To give the people some idea how much red tape there is to go through in paving a street or making other improvements, the local paper, the *Times*, has compiled the following statement of the process: There are two ways to improve a street. One is by resolution and the other by petition. The former route takes about four months, but is considered the safest. This method is now used almost entirely. A resolution is presented and referred in the form of a petition. It is reported upon by the committee at a subsequent meeting and adopted. The next move is to instruct the Board of Public Works to assess benefits and damages. This is done and a date set for a hearing before that body. The proceedings are then passed on to the Council, and the time is set for another hearing. The report is then confirmed and a resolution passed fixing the benefits and the city's portion. A resolution ordering the work done is referred to a committee. The committee report on the resolution at the next meeting and adopt the resolution on the same night. The Council then instructs the Board to advertise for bids, one each week for four weeks. The Board receives the bids, awards the contracts and then sends the bids to the Council for confirmation. Then if there are available funds and the Mayor signs the contract, the improvement is made. By the other process a petition is presented to the Council and referred. At the next meeting a report is made if the petition is properly signed and has a majority of foot frontage. Then a resolution is passed stating that the majority of foot frontage is represented. It's referred again and the Board of Public Works is authorized to advertise for bids and let the contract. This method takes about two months to go through.

Granite Block Cutters in Demand

Westerly, R. I.—There is a big demand now in Westerly for paving cutters, and it is very probable that the demand will be kept up until cold weather sets in, when it will be impossible to work. Thousands of the granite blocks are being cut each week in the Westerly quarries.

One day last week two automobiles came to town from the east. They carried most of the city government of the city of New Bedford, Mass. They were looking for paving blocks, besides having a good day's spin across Rhode Island on the fine roads. The city has a large amount of work to be done in the paving business, and they have made up their mind to use nothing but Westerly granite. They wanted 400,000 of the pavers, but after covering the entire town the most they could raise for delivery this year was 60,000. They sent here for bids some time ago, but had let the matter rest. Now they are too late. But they are determined to have Westerly granite on their streets, so the work in New Bedford will not be as heavy this season as was anticipated. The city will buy next year the rest of the paving which is needed. This demand for Westerly granite in the paving block business all over the country is caused by the demand there is for the new style of paver. It is so made that the dimension on top is small and the sides must be clean, so that the blocks will set close together. The blocks are set on concrete and filled with tar. It is said that this style of block is being used in the big cities now and that a very smooth surface is being secured.

SEWERAGE AND SANITATION**Campers Must Observe Sanitary Rules**

Binghamton, N. Y.—Health Officer D. S. Burr, in a communication to Commissioner of Health John E. Bloomer, has advised that the matter of establishing summer camps on the banks of the Susquehanna River, at points where a contamination of Binghamton's water supply is possible, be taken up at once, and an effort made to prevent any possible contamination.

Gas Works Waste Interferes With Disposal Plant

Enid, Okla.—The sewage disposal recently installed has not worked satisfactorily. The reason alleged is that waste from the gas works has prevented the proper chemical reactions from taking place. It has been decided to clean the septic tank. By an agreement of the parties interested, the company that installed and guaranteed the plant will pay one-half, the city one-fourth, and the gas company one-fourth.

Studied German Method of Beet Pulp Disposal

Lansing, Mich.—Thomas A. Ainge, Lansing, expert for the Michigan Sanitary Commission, who was sent by the State to accompany General Manager William Wallace, of the Michigan Sugar Company on a tour through the beet factories of Germany, to investigate the methods of disposing of the pulp, will soon make his report and recommendations for remedying the contaminating influences that the beet pulp has on the waters in which it is dumped.

Analysis of Ice a Needless Formality

Logan, Utah.—Three samples of water from melted ice that had been cut in the Logan ice ponds were yesterday forwarded to State Chemist Herman Harms by State Food and Dairy Commissioner Willard Hansen, for analysis. The samples were so full of floating dirt and pond refuse that they could be condemned without the formality of an analysis.

New Sewage Pumps Installed

Providence, R. I.—The new pumps at the Ernest Street precipitation plant, and the new pumping engine at the Hope reservoir, will be started up late this week, the testing of each being about the middle of the week. The Morris Machine Works sewage pumps, now installed at the precipitation plant, are of a radically different type than those which have become worn out in service there. The new pumps are of the centrifugal type, in which the mechanism is very simple, and not very liable to get out of order. It is expected that there will be an increase in the daily pumping average, the centrifugal type having a capacity of 1,750,000 gallons per hour, 42,000,000 gallons per day. This is a much higher figure than the old style of pumps, which had a capacity rated at 36,000,000 gallons daily. The new pumps, there are two of them to each of the three engines, have each an inclosed fan or impeller which draws the water from the sewer or the main, passing it out through an outlet pipe on a tangent. The impellers are 36 inches in diameter, and the pump itself, with base plate, is 6 feet in width. City Engineer Clapp says that the old steam engines at the precipitation plant have been retained, and changes have been made to adapt them to the centrifugal pumps by grooving the fly-wheels for rope drive. At the Hope reservoir the Worthington pumping engine, just installed, will be started up this week. This is a high duty, triple expansion engine of the compensating type, and rated at a daily capacity of 10,000,000 gallons. The old engine of the Nagle type, which has been discontinued, was able to accomplish about 2,500,000 gallons daily during the last few years of its twenty-three years of life.

Village Has New Board of Health

Silvis, Ill.—The Village Board has created a health department by ordinance. Residents will be compelled to supply garbage cans and keep them in the alleys. The garbage will be collected by an employee of the village. Dr. W. B. Chapman, who has served in the capacity of health commissioner, will act as chairman of the Board of Health.

Board of Health After House Fly

Macon, Ga.—The Macon Board of Health is right on the trail of the house fly this year, and is doing all it can to stamp out this breeder of disease and carrier of germs. More houses have been screened this year than ever before and more precautions are being taken to kill out the flies, as well as to keep them out of houses.

Cleaning the Moshassuck River

Providence, R. I.—Last week a force of laborers under City Engineer Clapp began a thorough cleaning of the Moshassuck River, which runs through the city, which has been a dumping place for miscellaneous rubbish. This consists of discarded furniture, old barrels and packing boxes,



Courtesy of Providence Journal.

HOISTING RUBBISH FROM RIVER BED

worn-out wagons and a nondescript mass of other materials. The combustible rubbish will be carried to dumps, allowed to dry and burned. The illustration shows the means by which the stuff is raised to the street after it has been removed from the stream with rakes or by hand.

Water Falls Spread Typhoid

Rochester, N. Y.—According to a report which the Monroe County Medical Society has received from its committee on public health, the spray from the lower Genesee Falls is a distributor of typhoid. Several specific instances where typhoid fever is believed to have been contracted directly from the falls were investigated. The infectious character of the spray was first brought to the attention of the society's committee through a case of typhoid fever. The frequent presence of the patient in the spray area of the falls was the only imaginable solution of the cause of the case, and this fact led to experiments. Pieces of cloth were exposed to the spray, and then examined. Sewerage bacteria were found.

Thirty-Day Notice to Purify Water

Trenton, N. J.—The State Board of Health has served notice on the Trenton Board of Water Commissioners to have the city's drinking water properly purified on or before June 15. It is presumed that the use of hypochlorite of lime is referred to, although the State Board has not volunteered any information as to what means were to be employed.

WATER SUPPLY

Report on Future Water Supply of Akron

Akron, Ohio.—Prof. E. W. Bemis has submitted his report on the water question to the city officials. He favors East Reservoir as the place to secure water for use in the future. The water from Summit Lake would not do, even if filtered. The water from Long Lake could be filtered, but that from East Reservoir is preferable, because the water level is twenty-six feet higher. The value of the plant of the Akron Water Works Company is placed by the company at \$1,196,768, which Dr. Bemis considers 5 per cent too high. The company is earning about 7 per cent on its investment.

City Officials Inspect Lake Altoona Operations

Altoona, Pa.—With a view of satisfying themselves as to the cause of the slow progress that is being made on the work of constructing Lake Altoona, Water Commissioners H. K. McCauley and H. H. Riffin, accompanied by Superintendent Gailey and Secretary C. B. Campbell, went to the site of the new basin and spent some time going over the operations.

The officials were handicapped in their visit by reason of the fact that they could find no one in authority when they arrived. R. J. McKallip, one of the members of the Carothers Contracting Company, has been in Mexico since last fall, having gone there for the benefit of his health, while Mr. Carothers, who has had charge of the operations, could not be found.

The thing that impressed the officials the most was the apparent lack of sufficient men to carry on the work. One of them stated that a contract the size of that ought to have at least 200, and if possible, 400 men, but they could not see that there are over 100 on the job. One of the foremen stated that they have had much difficulty in getting laborers, which accounts for the slow progress that is being made.

The work is now proceeding on the embankment. The core wall has been about completed, and the work to be done now is to fill up the embankment to this wall. This is a big undertaking, thousands of loads of material being required, and the work is of such a character that an unlimited number of men could be engaged in it. As it is, there are not enough men to properly handle the job.

Meters Reduce Minimum Rates and Increase Receipts

Ardmore, Okla.—On the first of May, 1909, there were 1,050 water consumers, and at the present time there are 1,145, an increase of ninety-five during the year. It was determined that it would be more equitable to place all consumers upon meters and let them pay for the water they were actually using, thus reducing the expenses for pumping to the minimum and permitting a reduction in the price of water. Four hundred and twenty-three meters have been installed during the year and the meters have been ordered with which to furnish the remaining consumers. Under the present arrangement with meters, parties using the minimum amount of water pay fifty cents per month, whereas, they formerly paid one dollar per month when they were on a flat rate. The amount of money collected for water consumed during the past year was \$14,532.28, while during the previous year it was \$13,209.95.

No Free Water for Power Purposes

Pittsburg, Pa.—Free water for public institutions ought not to include the operation of power plants, in the opinion of the Finance Committee of Councils, in charge of granting exonerations. Water is to drink and cook with, to bathe in, and to wash clothing. Washing machine motors and elevators can be operated with electricity, and if the city finds hospitals or other institutions of a charitable character using it for power, they will be made to pay for it.

Des Moines Water Said to Be Impure

Des Moines, Ia.—Charles E. Gabel, chemist at Highland Park College, has condemned the water supply in the city, in the suit before the Federal Court to test the validity of the franchise under which the water company is operating. He said tests show it impure.

Twenty-Year Water Works Bonds Burdensome

Cincinnati, Ohio.—General Superintendent Laidlaw, of the Water Works Department, says that the water works cannot be run during 1911 on less than \$1,170,000, and that he will ask that at least that amount be included in the budget for that year, which is now in the process of preparation. "Of this entire amount over half, or, to be exact, \$585,752.75, will be needed to cover the interest and sinking fund charges," said Mr. Laidlaw. "Our sinking fund and interest charges are larger this year than ever before, due to the bond issues which were necessitated during the year for betterments. We made a mistake in getting these as twenty-year bond issues, which naturally increases the annual charges for sinking fund and interest. Henceforward we will issue only thirty-year bonds. The increase over the present year for this item is a little over \$15,000. These charges are a very weighty load that we have to carry on our shoulders, and will have to be for many years to come. Were it not for this, we could cut our charges just in half. At least, we could and would reduce our water charges from 7½ cents per hundred cubic feet to 4½ cents, and still be making a large profit."

Report of Dallas Water Works

Dallas, Tex.—In his report for the last fiscal year, Chief Engineer J. M. Bassett of the Water Works Department, furnished information in detail about the work of the department for the year. As to rainfall, he showed, "the past year has been a notable one on account of the drouth which prevailed. I have a record of the rainfall at Dallas as far back as 1892. The average annual rainfall has been 24.22 inches, the greatest was 50.99 in 1905, and the lowest, except last year, was 25.64 in 1901. In 1909 it was only 16.91 inches. For the year ending Oct. 26, 1909, it was only 12.67 inches. For seventeen months ending April 1, 1910, it was 23.31 inches. Bachman reservoir has not been full since June 16, 1908."

The total consumption of water in the fiscal year was 543,137,388 less than for the previous year, a decrease of 13.8 per cent. This was because of the drouth. In Oak Cliff, not affected by the dry weather, there was an increase of 29.8 per cent in consumption of water. The daily average in Dallas was 9,283,838 gallons, and in Oak Cliff, 686,183.

During the year the new pumping station at Turtle Creek was put into commission. The newest of the Holly engines, used for twenty years, was removed and rebuilt in the new station. A low service station has been constructed at Bachman, with a 16-inch centrifugal pump, handling 10,000,000 gallons a day against head, and 12,000,000 into the conduit to Turtle Creek, thus either filling Bachman, or relieving Record station, allowing the first repairs to boilers and pumps there in several years. About 4,500 feet of the old wooden conduit has been replaced with 36-inch cast iron pipe. The engineer says that 4,800 feet of the old wooden pipe is leaking badly and should be replaced with iron or concrete. A new high-pressure boiler is being installed at Oak Cliff station.

The Trinity well, a large bore being sunk by B. J. Harper, of Houston, is down 1,150 feet. Of the four Paluxy wells under contract by R. H. Dearing, No. 1 is down 550 feet, No. 2 is 100 feet, and the other two are ready for boring.

Bachman reservoir lacks three feet nine inches of being full. Record reservoir is thirty inches below the top of the dam. Turtle Creek reservoir is full.

The new Tod engine at Turtle Creek ran 6,395.2 hours and pumped 2,019,347,009 gallons in eleven months.

In the dry period last year, 7,600,000 gallons were pumped into the mains from the City Park well. Oak Cliff pumped and used in the year, 250,456,698 gallons. Elm station pumped in 6,752.57 hours, 3,210,856,586 gallons. Out of Bachman reservoir, the city used in the year 240,850,000 gallons.

Foundation for Evansville Filtration Plant Finished

Evansville, Md.—The last of the 1,800 piles forming the piers for the foundation of the new filter plant have been finished. The contractors for that part of the work, the Cranford Paving Company, Washington, D. C., are shipping their plant away, and A. Bentley & Son's Company, Toledo, Ohio, who will construct the filter basin, is setting up its apparatus. Work on the foundation was retarded by high water, but rapid progress has been made in the last three months.

Present Status of Omaha's Water Troubles

Omaha, Neb.—The Omaha Water Company is just now having a war of words with the Omaha City Water Commission over existing conditions pending the opinion anxiously awaited from the United States Supreme Court as to whether the city must or must not accept the appraisalment of \$6,250,000, which included the plants in Omaha, South Omaha, Dundee and Florence, awarded by three expert engineers. The Omaha Water Board contended that the appraisalment was excessive to the extent of \$1,250,000, and refused to accept it. The result was litigation galore, which is still pending. Upward of \$400,000 hydrant rentals covering a period of more than two years are being held up by the City Council on the plea that the Omaha Water Company has no franchise, etc. In the meantime the taxpayers are pounding both sides to the controversy, insisting upon better fire protection and a superior quality of water. An opinion is anticipated from the Supreme Court within a few weeks which will determine whether the city will be required to take over the plant or whether a new appraisalment may be made. Water works bonds for \$6,000,000 were voted two years ago, which places the city in a position to act if the judgment is favorable to its contention. Following a series of analyses of the Missouri River water and during an epidemic of typhoid fever this spring the Board of Health prevailed upon the Federal authorities to send an expert chemist to Omaha to investigate the quality of water and determine if possible the source of pollution if any existed. After careful investigation a report was submitted recommending that a chlorine purification plant be installed. Since this has been done the death rate from typhoid fever has been materially reduced and the quality of water greatly improved.

Low Water Rates Essential to Manufacturing Center

Kansas City, Mo.—J. A. Runyan, Industrial Commissioner of the Commercial Club, has called attention to the importance of low water rates to the commercial prosperity of a city. He cites, as an instance, the case of St. Louis, which has just lost a big cotton factory because its water rate was too high. The location was considered favorable, but the men at the head of it estimated the factory would use an average of 4,000,000 gallons of water daily. At the rate now charged the cost of this item alone to the factory would be \$75,000 a year. The factory now is seeking another location.

Roundabout Way of Supplying Consumers

Norfolk, Va.—Apropos of the contemplated sale of the County Water Company to the city, the fact develops that the Norfolk City Water Department is selling 10,000,000 gallons of water per month to the County Company. This quantity, however, is no greater than the amount supplied through the County Company's distribution pipes to city consumers. The difference between the buying and selling price is considered as excessive. The County Company is charged one and a half cents per 1,000 gallons for the water, the bare cost of pumping, and the company retails this water to city consumers for forty cents per 1,000 gallons.

STREET LIGHTING AND POWER

New Lighting System Opened in Columbus

Columbus, Ohio.—What is considered the most beautiful system of lighting in Columbus was dedicated by a big opening of the Main Street business district between High and Fifth Streets, May 18. Fully 5,000 people attended the opening exercises. Every few feet on East Main street a green column rose from the ground, unattended by the usual wires, which in the Main Street system are all underground. On each pole were five green lights. A movement was started the next day to have the system continued out Main street, two blocks farther. During the exercises dedicating the new "Great Light Way" speeches were delivered from the balcony of the Hartman Hotel by Mayor Marshall, John Y. Bassell, Secretary of the Chamber of Commerce; W. O. Frohock, and others. A parade was held during the evening, and a banquet of prominent men of the city was held following the exercises at the Hartman Hotel.

City's Cheaper Gas Demand Near Ready

Baltimore, Md.—Within two weeks the Public Utilities Commission will probably have before it for consideration the demand of the city of Baltimore on the Consolidated Gas, Electric Light and Power Company for cheaper gas. Dr. Horace T. Flack, head of the Department of Legislative Reference, is preparing statistical information regarding the comparative cost of gas manufactured here and elsewhere, for the use of City Solicitor Poe. Mayor Mahool believes that the people demand ninety-cent gas, and he is convinced they ought to have it.

City's Power Plans Discussed

Chicago, Ill.—Another conference to discuss the proposition of the sanitary district to furnish power to the city was held between sanitary district trustees and city representatives. A number of points not reached at the former meeting were first considered. One of these is the question of metering power supplied by the sanitary district for the operation of the present number of arc lights and 10,000 additional ones at \$15 a horse power yearly. In the proposition submitted to the trustees by the city's representatives it was suggested that the power be metered at the primary side of the city's substation transformer. Other points discussed were the taking over and operation by the sanitary district of all transmission lines and substations owned by the city; guaranteeing by the sanitary district of 99 per cent. continuous delivery of electrical energy to the city street-lighting circuit, the sanitary district to furnish the use of its own transmission lines and substations for the conveying of the additional light, free of any charge to the city.

Agrees to Give Eighty-Cent Gas

Haverhill, Mass.—All dickering between the agents of the Haverhill Gas Light Company and the members of the municipal council has been terminated by an agreement that the Board should abandon the idea of municipalizing the gas plant, and should satisfactorily close all litigation between the two corporate bodies, now pending in the Federal and State courts, settlement over the existing trouble between the municipality and the corporation being effected by the granting of a score or more of broad concessions by the company as requested by the council. The second vote to municipalize the gas plant, which would be necessary in order to put the question up to the people, will never be passed, according to a statement issued by Mayor Moulton. The Mayor, however, reiterated his statement that in all probability the council would very soon vote to take over the Haverhill Electric Company, or, at least, let the people decide the question.

From the concession it would appear that the city government has won about everything it asked for from the company, and in return it will do as agreed, namely, grant a franchise to the Haverhill Gas Company, make a satisfactory entry in the courts in regard to the eighty-cent gas litigation, and abandon the plant to manufacture and distribute gas. The two points which have been bones of contention for some few days—the giving of an eighty-cent rate to consumers and the payment by the company to the city of \$10,000 in taxes in 1910, and an increase of \$1,000 annually until 1915 and not less than \$18,000 yearly thereafter—have been agreed upon by the corporation agents, with the proviso that the eighty-cent gas stipulation shall not go into effect until the business of the company shall increase to an annual output of 450,000,000 cubic feet. At the present time the output is about 220,000,000 cubic feet.

Consider Plans for Municipal Lighting

New Brunswick, N. J.—Propositions regarding municipal lighting were considered at the last council meeting. The New England Water Power Company, of New York, presented an offer to furnish electric current to the city at one and one-half cents per kilowatt hour for power used all day, providing the city used 150 kilowatts during the term of the contract, the city to erect its distributing plant, estimated to cost \$40,000, the entire cost for each arc light annually being given at not over \$45. It also agreed to supply a customer to use the poles at an annual rental sufficient to pay the entire interest charge upon the cost of the distributing system.

The Lighting Committee recommended that a municipal gas plant was feasible, and likely to procure better gas at prices not in excess of what is now paid. In view of the fact that \$95 is now paid annually per arc lamp for electric lighting, and that the proposed rate of \$80 offered by the Public Service is excessive, it would be better for the city to install its own distributing system and buy current to operate it. It was also recommended that a twenty-four-hour contract be decided upon as the best, the electric energy by day being used to operate the water works. It was urged that an expert be engaged to report upon the changes necessary at the water works pumping station, and design an adequate distributing system.

Proposed Gas Ordinance Puzzle to Underwriters

New York, N. Y.—Fire underwriters are looking for the precise reason why the proposed ordinance relating to gas and water pipes and shut-off valves was introduced in the Board of Aldermen by Alderman Johnson, on May 3. In effect it provides that buildings in which gas is used shall be equipped with a "mechanical device or devices" which will enable "any person to shut off or turn on the supply of gas" from the outside of the building. The chief of the fire department is to designate the point or points where the device shall be installed, and it shall be approved by him. Buildings used for residential purposes and using but one meter are exempt. The measure, which amends section 89 of chapter 15, part 16 of the building code, has been referred to the Committee on Buildings. Its ostensible purpose is to shut off the supply of gas in case of fire. The fire underwriters object on the ground that such an arrangement would offer great opportunities for those maliciously or mischievously inclined. A valve, accessible from the street, improperly manipulated might easily cause a building to fill with gas and result in loss of life and property through explosion and fire. The New York board does not propose to allow the measure to become a law without a strong protest.

Light Buttons in Wrong Place

St. Joseph, Mich.—City Elevator Attendant Johnny Green spends many futile hours at the city hall these days turning off the electric lighting switches in the imitation marble corridors of the hall. Near the elevator entrance are two sets of lighting switches. Many people mistake them for the elevator signal push buttons and press them, thinking to signal the elevator. Instead, they turn on the corridor, first, second and third floor lights. Green keeps his eye on the switches and turns them off at the end of each down trip if someone has mistaken their purpose while he was up with a load of taxpaying passengers.

Franchise Expired with Original Company

Omaha, Neb.—The City of Omaha has scored a great victory in its legal contest with the Omaha Electric Light and Power Company. About a year ago the electric light company started to supply power as well as light. City Attorney Burnam protested that the company had no right under its franchise to supply power to private consumers. The matter dragged along for a while before the City Council, when finally the City Electrician was ordered to cut the electric light wires communicating with private power plants. The electric light company secured an injunction restraining the city from cutting its wires and the case developed into a lawsuit, which ended before the Federal Court recently when the city obtained an opinion that the present organization, the Omaha Electric Light and Power Company, which was organized after the dissolution of the Thomson-Houston Electric Light Company about four years ago, had no standing in court, that is, that the company's franchise expired with the original company. This decision is considered as far-reaching with franchise corporations all over the country, and will affect both the street railway company and the Bell Telephone Company at Omaha. Plans are now being perfected for the holding of a special election for the voting of a franchise to the electric light company, but opinions are at variance between the city and the company as to the time limit on the franchise. The electric light company is clamoring for a fifty-year franchise, while the city is not disposed to exceed the limit of more than one-half that period.

FIRE AND POLICE

Bay City Visitors Inspect Lansing Fire Department

Lansing, Mich.—"It is the fastest and most logical way," declared the members of the delegation from Bay City, who came to Lansing last week for the purpose of seeing demonstrations of the auto fire apparatus in use here. After a demonstration of the auto engine, which shot water nearly across the river in the rear of Central Station, and an exhibition by the autos from that station and the horse rig from Station No. 3, which was beaten by two minutes to the South street box at Washington avenue, the Bay City officials declared that the autos were the only thing for the city they represented here. The delegation, which consisted of Mayor Gustave Hine, Chief Engineer Harding, Aldermen Gardner, Judway, Gliniecki and Tierney and a number of firemen from the ten stations in Bay City, arrived in Lansing over the Michigan Central Railroad a little after noon. The officials were met by Chief Delfs, Mayor Bennett, Police and Fire Commissioner John S. Wilson, Aldermen Ziegler, Raudabaugh and Christopher and City Treasurer Reutter and City Clerk Gray. Aldermen Parker and Van Halteren later joined the party. The South street box was "pulled," the auto rigs from Central Station and the horse-drawn "hooks" responding as well as the company from Fire Station No. 3. All rigs were timed. The autos made their get-away and reached the box a mile and a quarter from each station in 2 minutes and 15 seconds. The horse rigs required double that time, although they made fast runs.

Lower Standard of Height for Firemen

Boston, Mass.—The City Council went on record as unanimously in favor of regulations in the city's Fire Department which will permit a man 5 feet 5 inches tall to become a fireman if he meets all other requirements. The height fixed by the Fire Commissioner at the present time is 5 feet 7 inches, and as a result of that fact at least ten applicants for the Fire Department have been on the waiting list for more than two years because of their height.

Cleveland Weak in Numbers of Police Force

Cleveland, O.—Data gathered by Secretary Martin, of the Department of Public Safety, at the request of Director Hogen, shows that Cleveland is far behind other large cities of the country in police protection, so far as the size of the force is concerned, and that the fire equipment of the city also falls behind in many respects. Director Hogen strongly favors an increase in the size of the police force and the erection of four new fire stations. His estimate, prepared for the Mayor's 1911 budget, allows for the increase in the size of the Cleveland police department.

Fire Marshal Asks Councils to Assist

Columbus, O.—John W. Zuber, State Fire Marshal, has sent a letter to every Mayor and fire chief in the State warning them of the dangers incident to the Fourth of July. Enclosed is a copy of an ordinance which they are requested to introduce in Council. This ordinance prohibits the giving away or having in possession for sale or offering for sale in the various municipalities of the many kinds of fire works and other articles for the making of a pyrotechnic display. It provides, however, for large celebrations under proper authority and control. The ordinance is similar to that which went into effect in Cleveland last year.

Detective Bureau to Be Organized

Paterson, N. J.—A police detective bureau working under the supervision of Chief of Police John Bimson, with a captain and plain clothes men appointed by the Board of Fire and Police Commissioners, will be established in the local police department within a few weeks if a resolution introduced and passed to second reading is acted upon at the next meeting of the Board. Absolute control of the proposed detective bureau is vested in the Commission, and under the reading of the proposed resolution the appointments for this bureau may either be taken from the members of the police department or otherwise.

Annual Inspection of Fire Department

Erie, Pa.—The firemen of Erie made an excellent showing in the annual inspection, May 18. From 9 o'clock in the morning until 5:30 the next day, Commissioners Hogan, Walker and Haas, Chief McMahon and Secretary Ford were busy visiting the several fire houses and watching the performances of the men in hitching the horses to the apparatus, preparatory to responding to an alarm of fire. No. 5 Hose company carried off first honors, making the floor hitch in the remarkable time of $4\frac{1}{2}$ seconds and the bunk room hitch in $7\frac{1}{2}$ seconds. In the so-called floor hitch, the men are assembled on the main floor in close proximity to the apparatus. In the bunk room hitch, all, with the exception of one man, are undressed and in their beds when the alarm is sounded.

Below is a table showing the time in seconds for the floor hitch and bunk room hitch, compared with the records of a year ago:

Companies.	Floor Hitch		Bunk Room Hitch	
	1909	1910	1909	1910
Engine No. 1.....	14	17	17	26
Hose No. 1.....	$6\frac{1}{2}$	7	$16\frac{1}{2}$	15
H. & L. No. 2.....	14	15	15	26
Engine No. 2.....	7	6	15	15
Hose No. 2.....	$5\frac{1}{2}$	5	9	10
Engine No. 3.....	6	11	9	15
Hose No. 3.....	6	6	8	17
Chemical No. 1.....	6	7	9	17
H. & L. No. 1.....	11	11	$13\frac{1}{2}$	15
Engine No. 4.....	$5\frac{1}{2}$	..	16	..
Hose No. 4.....	5	10	10	15
Engine No. 5.....	8	8	14	12
Hose No. 5.....	$4\frac{1}{2}$	5	$7\frac{1}{2}$	$9\frac{1}{2}$
Engine No. 6.....	7	7	14	24
Hose No. 6.....	10	9	15	11
Engine No. 7.....	10	7	14	11
Hose No. 7.....	6	5	11	11
Engine No. 8.....	7	6	11	20
Hose No. 8.....	9	9	9	14
Engine No. 9.....	9	12	17	23
Hose No. 9.....	6	6	10	11

Grand Forks Provides Police Matron

Grand Forks, N. D.—The Grand Forks City Council has passed an ordinance providing for a police matron and probation officer. This is the first action of the kind to be taken in North Dakota.

Accident to Engine of Fire Department

Knoxville, Tenn.—Fire engine No. 2, the "Joseph T. McTeer," the largest in the city, drawn by three horses, of the Commerce avenue fire station, overturned last week at the corner of Central street and Commerce avenue, slightly injuring one of the firemen. The other two firemen on the engine escaped injuries. The grade on Commerce avenue was very slippery from the rains, and as the engine was making the sudden turn at the corner, the rear wheels skidded for a distance of more than 20 feet, throwing the engine against the curbing of Central street. The engine overturned on the side where the injectors and other mechanical apparatus is located and at present no estimate of the damage can be made. Chief Sam B. Boyd stated that probably the greatest loss will be the freight charges in sending the engine to and from the factory for repairs.

Policeman Loans Auto for a Patrol Wagon

Kokomo, Ind.—The city having stubbornly refused to purchase a patrol wagon, Capt Windoffer has supplied a method of taking care of those arrested for being intoxicated. Enos M. Wallace, a retired merchant, of Hemlock, who has just become a member of the Kokomo police force, owns an automobile and has placed its use at the disposal of the city. The big machine has been given quarters at the city building for emergency calls.

Plan to Save Money by Uniform Engine Houses

Los Angeles, Cal.—The Fire Commission has asked the Council to give it authority to adopt uniform plans and specifications for single and double engine houses so that in future it will not be necessary to employ an architect to prepare new plans for every new building. Architects' fees are a large item in the city's expense account. Should the Council agree to the plan all engine houses in future will be alike, except where the physical conditions of a site prohibit the erection of the uniform type.

GOVERNMENT AND FINANCE

Who Pays for Hurts on Torn-up Streets?

Minneapolis, Minn.—The question of responsibility for accidents when streets along street car lines are torn up is puzzling city authorities. The matter came up before the railroads committee. Street railway officials declare that the city is responsible when a person steps from a car to a torn-up street and is injured. Frank Healy, city attorney, said the company should erect temporary platforms at crossings when streets are torn up preparatory to paving. E. R. Dutton, assistant city engineer, thought otherwise. Mr. Healy will report back to the committee.

Big Increase in Philadelphia Ratables Is Planned

Philadelphia, Pa.—Councils' joint committee to investigate the tax assessments, with a view of making a report recommending increases that will boost the revenues of the city to avert the growing annual deficits, held its first meeting in the room of President Hazlett, of Select Council, and Edward W. Patton, who introduced the resolution creating the committee, was made chairman. In addressing the members Chairman Patton said it was the most important committee appointed by Councils for many years, and upon its efforts and recommendations depended the future success of the city administration. William J. Milligan, Chief Clerk of Select Council, was made secretary and was instructed to forward to the Real Estate Brokers' Exchange the resolution creating the committee. This provides for the selection of two experts having knowledge of real estate values, to be selected from the membership of the real estate men, and a builder to be chosen by the exchange. The committee is charged with making a report to Councils by December, and is authorized to compel the attendance of witnesses to give information as to values in various localities of the city. The committee will extend its investigation over the entire city, and not confine its efforts to central realty as was originally proposed. The political leaders are anxious to boost values so that the city will have a \$2,000,000,000 assessment. For the present year it is officially fixed at \$1,410,000,000.

Commission Plan for Port Huron

Port Huron, Mich.—In all probability Port Huron will hold a special election the first Monday in December this year, at which time a Mayor and four commissioners will be elected, pursuant to the proposed establishment of the commission form of government. It is proposed to pay the Mayor a salary of \$2,000, while each commissioner will receive \$1,500. It has not been determined yet whether the Mayor shall devote his entire time to the interests of the city or whether the city clerk shall be made a purchasing agent for the city.

Reform of City's Accounting System

San Francisco, Cal.—A preliminary statement of the general plans and probable recommendations of a committee of certified accountants appointed by the Merchants' Association to examine the city's financial methods has been made by Chairman Anson Herrick, as follows:

1. The placing of the accounts of the city upon a revenue and expenditure basis, as against the cash receipt and disbursement basis employed at the present time; which modification will make it possible to exhibit the expenditures and revenues as against the periods during which they were incurred or earned.
2. The requirement of an accounting for properties, so that the materials and equipment used will constitute a part of the cost of the service performed at the time of consumption.
3. The exhibition of costs to the greatest extent practicable so that the taxpayer may be in a position to determine the relative efficiency of different administrations.
4. The maintenance of records which will at all times exhibit the entire liabilities, current and funded, and the entire assets of the city, both fixed and floating.
5. The classification of revenues and expenditures in such a manner as to permit of accurate and intelligent comparison with the revenues and expenditures of other cities of like character.

STREET CLEANING AND REFUSE DISPOSAL

People Must Pay to Haul Rubbish

Evansville, Ind.—The Board of Works has given no order for hauling away the rubbish collected on Clean-up Day. The Board takes the ground that citizens must remove the rubbish at their own expense. It is said that many persons have taken advantage of Clean-up Day in former years to require the city to haul away their ashes, tin cans and rubbish of all sorts. The city found it very expensive.

Clean-up Day at Plainview

Plainview, Tex.—The picture below shows one of the many piles of cans and scrap-iron collected on Plainview's Clean-up Day. Fourteen school boys collected this pile in one day. There were eight such piles on vacant lots in the city, collected in one day by school children. All boys in the public schools were given a holiday and divided into eight companies with a captain for each company and a



Courtesy Dallas News.

RUBBISH COLLECTED BY FOURTEEN BOYS

cash prize given to the company which got together the largest pile of non-combustible material. The little fellows worked like Trojans and the eight piles were so near even that all companies were given a cash prize of \$5. By this method the city was cleaned of all non-combustible material at a cost of \$40, and done in one day. The ladies also took a hand and had twelve wagons to collect papers and trash and burn it. One could look over the town any time during the day and see a wagon followed by ladies to see that the men employed did not miss a single scrap of paper or trash of any kind.

Provisions of New Garbage Ordinance

Elkhart, Ind.—The City Council is considering the passage of an ordinance which makes it unlawful for any one to throw garbage of any description in any public place, or to allow rank weeds to grow on vacant lots. Other provisions follow:

Receptacles for garbage must be clean and close tight and be emptied frequently.

Weeds must be cut and hauled away on order from the Board of Health after reasonable time. If not done on order the Street Commissioner does it and recovers from the owner through the city.

Vaults must be cleaned on order of the Board of Health and if not done by owners, looked after by the city and the costs become a lien on the property. Vaults may be cleaned between 8 p. m. and 5 a. m. The penalty for violation is \$25.

No foul smelling matter shall be moved through the city between the hours of 10 a. m. and 6 p. m.

Refuse about butcher shops must be removed every twenty-four hours and on Saturdays be wholly removed after 4 p. m. The penalty for violation of this provision is a fine of not to exceed \$10.

Slop must not be moved between the hours of 8 a. m. and 6 p. m. Penalty for violation \$5.

Wagons for hauling manure, garbage, sand, etc., must be tight so as not to scatter along the streets. Penalty for violation may be \$25.

Carts for hauling garbage, swill and other offensive matter must be tightly covered. Penalty for violation may be \$20.

RAPID TRANSIT

Progress on Beacon Hill Tunnel

Boston, Mass.—Work on the Beacon Hill tunnel, as the new subway which will connect with the East Cambridge subway is familiarly known, is being rushed with all the speed possible by the Boston Transit Commission. The gigantic undertaking was begun at the corner of Grove and Phillips streets, and already about 300 feet of the tube has been completed. At first a double-barreled tunnel was built for a distance of about 100 feet toward the Common and then a single tunnel was built for an additional 200 feet. At the present time the workmen are almost 100 feet below the surface at Pinckney street. Foundations for the walls have been laid for another 100 feet. These foundations are laid along the sides so as to support the heavy construction shield with which the men bore out the core in the middle and mold the arch overhead. Hence two gangs of workmen, including carpenters and excavators, keep about 100 feet ahead of the main gang and dig the side passages about 10 feet by 10 feet in dimension, and lay the concrete foundation on which the walls are set as the main gang follows with the shield. It is necessary for the first gang to keep so far ahead, because the concrete they build needs several days to set sufficiently to give proper support to the shield.

The transit commission is waiting for the proper legislation to enable it to start work on the building of the Riverbank subway, which would join the East Cambridge subway near the State House so as to go under the Common on practically the same line, with perhaps only a wall between them. This project, however, is being held up by new legislation, so that the transit commission is holding up work on the contract, already awarded. The awaited legislation will give the commission authority to reopen to question of a route.

Public Service Uses its Hoboken Terminal

Hoboken, N. J.—Without a hitch of any kind the new \$250,000 double-deck terminal of the Public Service Railway Company was opened May 22, and the next day the cars were running there as smoothly and as freely as if the place had been in operation for several years.

Pipe Galleries for Subway

New York, N. Y.—The Public Service Commission has put it up squarely to the Board of Estimate to determine whether or not the new subways shall have pipe galleries. The present plans provide for such galleries, but the Board of Estimate has referred them back to the commission for a further study "as to the engineering and legal questions which are involved." To do this would mean, according to a letter sent to the Board of Estimate, either the advertising of the plans without making preparation for pipe galleries or a long delay.

Standing Passengers Must Pay

Syracuse, N. Y.—The Common Council has no power under existing franchises to compel the Syracuse Rapid Transit Company to provide more seats for its patrons, according to an opinion by Corporation Counsel Walter W. Magee. Mr. Magee states that such a right could be included in franchises granted in the future, but is vested at present in the Public Service Commission. Cases are cited, holding that a railroad company has a right to collect fares from passengers who are standing in its cars, and upon their refusal to pay such fares it has a right to eject them. His opinion is in part as follows: "It is the duty of a street railroad corporation to provide reasonable accommodations for the transportation of persons over its lines. Each person riding upon its cars should be provided with a seat, and a failure of the company to do so would be a breach of contract; but, if no seat is available, such person can stand in the aisle of the car or upon the platform thereof, if permitted to do so by the company; and such person in consenting to ride in such manner waives the right to a seat; and upon refusal to pay a fare the company could lawfully eject him from the car."

Mayor Wins Fight for Lower Fares

Tacoma, Wash.—Ten days after taking office Mayor Fawcett triumphed by bringing the local street car company to terms. Last October Stone & Webster, owning all the street cars on Puget Sound, made a stiff advance on all suburban rates about Tacoma and Seattle. The fare to Fernhill, 6 miles south of the business center, was raised from 5 to 10 cents. Small riots occurred when the new fares were made effective. Fernhill promptly annexed to Tacoma, demanding the old fare because the company's franchise provides for a 5-cent fare within city limits. The street car company took the case into the Federal Court, and proceeded to collect the increased fares. Mayor Fawcett and the City Commissioners held a second conference with executive officers and counsel for the street railways. President Jacob Furth and General Counsel Grosscup would not agree to the Mayor's demands, and the Mayor told them not to expect another favor from the city, and demanded a 5-cent fare to Fernhill by a certain date. If not granted, he would take another measure. The result was the street car company restored the Fernhill 5-cent fare and made other reductions pending the outcome of the case in the Federal Court. Grosscup also stipulated that he will hurry the trial of this case.

MISCELLANEOUS

To Record Tides

Albany, N. Y.—City Engineer Melius is now preparing plans for a self-recording tide gauge that is to be installed on the State street pier for the Weather Bureau. The rise and fall of the tide will be recorded in the office of Forecaster Todd in the Federal building.

Cincinnati Has Finest Playground

Cincinnati, O.—"In the Sinton Park playgrounds Cincinnati has the finest playgrounds in the United States," said Charles M. Loring, capitalist, and for years president of the Park Board of Minneapolis, Minn., at the City Hall in company with former Park Superintendent J. W. Rodgers. "Nature has done much toward giving Cincinnati beautiful parks, and, while much has been done, there is still room for considerable improvement. I am surprised that more residence streets in Cincinnati were not planted with shade trees years ago."

Seeks Expert for Smoke Prevention

Dayton, O.—Following an offer from business men in the city to make up the difference between the salary paid by the city to the office of smoke inspector and that which would probably be demanded by an expert smoke authority, Mayor Burkhardt has been in communication with a number of officials of the United States Geological Survey on the subject, and it is probable that a specialist from another city will be brought to Dayton to solve the city smoke problem. A number of applications have been given consideration, but the Mayor is of the opinion that a man who has made a special study of fuel and smoke problems should be secured.

City to Sell Factory Sites

Milwaukee, Wis.—Mayor Seidel has a plan which he believes not only will increase Milwaukee's manufacturing industries, but will bring many dollars to the municipal treasury. He would have the city go into the real estate business and handle manufacturing sites as well as residence property. The Mayor proposes that the city buy land at low prices, plat it in accordance with his plans for increasing railroad side track facilities and resell it for factory sites at a comfortable margin of profit.

Street Traffic Rules Enforced

Rome, Ga.—From now on the street traffic laws will be rigidly enforced. Mayor Hancock instructed Chief of Police Harris to see to it hereafter that all vehicles keep to the right of the street and that racing up and down the streets by automobiles and motor cycles be stopped.

LEGAL NEWS

A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

Police Commissioner's Power of Removing Aged Officers

People ex rel. Lindemann v. Bingham, Police Com'r.—Greater New York Charter, § 355, providing that, on their own application, members of the police force of the age of 55, after serving 20 years or more, may, or on a certificate of incapacity members of any age who have served such time shall, by order of the commissioner, be retired and placed on the pension roll, and that members of the age of 55, who shall have served 25 years, and members who are honorably discharged soldiers or sailors of the Civil War, who are of the age of 60 or served 20 years, shall be retired on their own application, and said commissioner may in like manner relieve from the service and place on the roll of the police pension fund, and grant and award a pension to any member of said force other than an honorably discharged soldier or sailor of the Mexican or late Civil War, who shall have reached the age of 60 years, empowers the police commissioner to compulsorily retire a member of the force who has passed the age of 60 years, and section 354, authorizing the commissioner to retire any member of the police force because of disability, or because superannuated by age, does not support a contrary construction.—Court of Appeals of New York, 91 N. E. R., 380.

Street Railway Franchise—License Fees

City of New York v. New York City Ry. Co.—Laws 1860, having granted a street railway company a franchise to construct and operate a railroad on certain streets in the city of New York, subject to such reasonable rules and regulation as the Common Council may from time to time prescribe, with a provision as to payment to the city of an annual license fee, on which the parties put the practical construction of meaning a fee of \$50 per car, based on the greatest number of cars in daily use at the busiest season of the year, and not on every car used during the year, and with a provision authorizing and requiring the City Council to grant the company permission to construct and operate the road, and there having been in force at the time Laws 1860, declaring it to be unlawful to construct and operate a railroad on a street of such city, except under the authority and subject to the regulations and restrictions which the Legislature may grant and provide, so that the Legislature, as the sole source of the rights of franchise for such a construction and operation, could alone prescribe the regulations and restrictions therefor, the city had no right to collect, or to impose a penalty for failure to pay, a greater license fee, because of the permission of the Common Council to lay the tracks providing that the company should be subject to certain ordinances, providing that every passenger car running in the city should annually pay it \$50 for a license, and declaring a penalty for failure to exhibit in the car the certificate of payment.—New York Supreme Court, 122 N. Y. S., 458.

Eminent Domain—Due Process of Law

Boston Chamber of Commerce, the Central Wharf & Wet Dock Corporation, and the Boston Five Cents Savings Bank, Plffs. in Err., v. City of Boston.—The owners respectively of the fee of land taken for a public street and of an easement of way, light, and air over such land, and the holder of a mortgage on the same, subject to the easement, cannot successfully claim to have been denied rights under United States Constitution, 14th Amendment, because they were not permitted to pool their interests and have the damages assessed in a lump sum, and estimated as if the land was the sole property of one owner.—United States Supreme Court, 30 S. C. R., 459.

Defective Sidewalks—Roller Skates

Collins et al. v. City of Philadelphia.—A city is required to keep its sidewalks safe for ordinary requirements, but has no obligation to provide safe pavements for roller skates.—Supreme Court of Pennsylvania, 75 A. R., 1028.

Municipal Assessment—Cloud on Title—Action

Bussing v. City of Mt. Vernon.—Under the rule that an action to remove a municipal assessment as a cloud on title to real property cannot be maintained unless the proceedings are regular on their face, but are invalid only because of a defect dehors the record, which will not necessarily appear in proceedings to enforce the lien, with the exception that, where a statute provides that on a sale of lands for nonpayment of a tax, the conveyance given thereon shall be presumptive evidence that the tax was legally imposed and all other proceedings were regular, a suit to remove municipal assessments as a cloud on title brought before sale of the land for nonpayment is prematurely brought, where the defect complained of appears by record, though by municipal charter all assessments are ordered collected like taxes, and provision is made for redemption and notice, and a lease of such lands, when sold, is presumptive evidence that such tax was legally imposed.—Court of Appeals of New York, 91 N. E. R., 543.

Statutes—Validity—Judicial Questions

Town of Cicero v. Haas, County Clerk.—Laws 1901, as amended by Laws 1909, requiring the county clerk to ascertain the rates per cent required as to the property in the respective towns, townships, districts, incorporated cities, and villages in his county, and requiring him to reduce the rate per cent of the tax levy of the taxing district or municipality in the same proportion in which it would be necessary to reduce the highest aggregate per cent of all tax levies, exclusive of certain enumerated taxes, to bring the same down to 3 per cent of the assessed value of the taxable property, requires the city clerk to ascertain which taxing district or municipality has the highest aggregate per cent of tax levies, and he must then reduce this highest aggregate to 3 per cent in accordance with the statute, and thereby fix the county rate and other rates, and the county rate so fixed must apply throughout the county, and the rates for the other taxing districts must apply throughout such respective districts, and the act is not invalid as delegating power to tax to other corporate or municipal organizations, instead of the one which has the authority to levy the taxes. The argument that a statute is impracticable and imposes unjust restrictions on taxing bodies affected thereby must be addressed to the Legislature, and the court determining the validity of the act cannot consider it.—Supreme Court of Illinois, 91 N. E. R., 574.

Liability for Torts—Negligence of Contractor

Great Lakes Towing Co. v. Kelley Island Lime & Transport Co. et al.; Kelley Island Lime & Transport Co. v. City of Cleveland et al.—A city, given control of all public highways and bridges by statute, entered into a contract for the removal and reconstruction of a bridge across a navigable stream. In doing the work the contractor removed a line of piles placed around the central pier of the bridge to prevent vessel from coming in contact with it, leaving the ends of submerged timbers used in the foundation projecting beyond the superstructure unguarded and their position unmarked. Through the fault of another vessel a vessel passing through the draw was caused to sheer, and struck the ends of such timbers and was so injured that she sank. Held, that a provision of the contract requiring the contractor to take all precautions during the work to prevent injury to others did not exonerate the city from liability for the contractor's negligence which was one of the proximate causes of the vessel's injury, and that it was jointly liable with the offending vessel therefor, and each should be required to pay half.—United States Circuit Court of Appeals, 176 F. R., 492.

Bonds Election—Sufficiency of Proposition

Neacy v. City of Milwaukee et al.—A proposition submitted to the electors of a city of the first class for the issuance of \$500,000 of bonds for the construction and maintenance of a lighting plant does not with sufficient clearness declare what specific part may be expended in construction alone, and an adoption of the proposition, while the voters knew of the report of the city engineer that a plant could be constructed for \$250,000, is invalid, and the city may not issue bonds or take any other steps based on such adoption.—Supreme Court of Wisconsin, 126 N. W. R., 8.

NEWS OF THE SOCIETIES

Municipal Engineers of the City of New York.—At the meeting, May 25, a paper on the "Economic Aspects of City Planning" was presented by Benjamin C. Marsh, secretary of the committee on Congestion of Population. The paper announced on "The Asphalt Situation in New York," by George W. Tillson, was not presented on account of the illness of the author. An abstract of Mr. Marsh's paper follows:

The author admitted the impossibility of a layman attempting to explain in detail to a group of engineers how they should do their work, but asserted that the important point he would emphasize was the relation of city planning to the welfare of the community, and he gave the following definition of city planning: City planning is the orderly development of a city by which each section is arranged for the purpose for which it is best and most economically adapted, so that a harmonious entity is secured. This development must be for the common good and not for the individual's gain.

City planning in this country has been chiefly aesthetic. In foreign countries much more important emphasis has been laid upon the need for improving the condition of living of the poorer classes and setting a high standard of housing for the unskilled wage earners.

We have inverted the procedure in this country. American cities farm out their poor to be exploited by the land speculators. The American system of laissez faire has resulted in permitting the shrewd and grasping real estate speculators and tenement sweaters to make fortunes from the poverty-stricken portions in the community. There are several important features of a comprehensive city planning to be considered at this meeting:

First, proper housing for the city's masses for a reasonable proportion of fair wages, and within easy access of their work. Second, direct and adequate roads connecting the main business centers of a city with smaller roads of such width and construction as not to impose an unnecessary and burdensome cost upon the occupants of small houses. Third, a proper system of sewage disposal and of pipes and wires. Fourth, the economic location of factories and the prohibition of factories in districts where they will be an injury to the neighborhood, and as a necessary corollary, the provision of means of carrying freight. Fifth, the elimination of the cost of carfare to the working population so far as possible. Sixth, the decentralization of the city's business, pleasure and educational interests. Seventh, the provision of adequate parks, playgrounds and open spaces with space for public buildings to furnish not merely sites, but settings. Eighth, such control over the location and volume of buildings for manufacturing and office purposes as will enable the city authorities to anticipate and provide adequate means of carrying passengers. Ninth, the control of the development of new and unbuilt sections of a city, and the incorporation of adjacent areas so that their development may similarly be controlled.

The standard of housing for the working population of a city is a matter which is to be determined by each city logically and in general. Rules cannot be laid down for the determination of each city's housing, especially

as it is true that there cannot be building regulations or tenement regulations economically and logically for all sections of a community. In order to secure, however, the harmonious development of a city in the interest of all the citizens and the possessors of the most valuable points in this country lying in the business sections of great cities, it is necessary that we should have a proper extension of the police power of the city and that this should involve not merely regulations as to fireproofing; but restriction on the use of buildings and the extension of the taxpaying power of the state, which must be considered part of the police power. Under the police power also must be classified that extension of the control of the city over its new developments involved in the determination of where factories may locate and what they may need. The need for such distinction is so apparent that we realize that the developments of Manhattan determine not only the financial interest of this borough, but, what is vastly more important, determine also the welfare of hundreds of thousands of New York citizens in other boroughs.

The most important point, of course, to be considered, however, in city planning since we are not considering chiefly the technical requirements is the preservation of the outlying sections of the city from the duplication of those evil conditions recognized and deplored in the built-up sections. For our American cities to develop, the best methods are required in genuine city planning. To prevent the duplication of the deplorable conditions of most cities requires not only a reasonable amount of genius, but equally a considerable amount of courage on the part of city officials, and this is the task to which all American cities are summoned—the elimination of the cost of carfare to the working population and the consumer as one feature of proper city planning.

Most American cities have merely lost their heads over rapid transit and are absorbed with the idea that the wage-earning population want to spend an hour and one-half or two hours a day riding to and from their work. This cost of transportation, however, is, in fact, a serious economic waste in production. There are nearly 700,000 workers in factories in New York. A minimum of \$30 apiece for carfare means a charge, largely waste, of more than \$21,000,000 a year, which is nearly one-eleventh of the total wages paid in 1905 in all manufacturing concerns in the city.

The waste of time is also a serious loss which should be prevented by the distribution of factories and offices and the decentralization of the various interests and business sections in great cities.

Fire Chiefs' Club of Massachusetts.—Chief John A. Mullen, of the Boston Fire Department, was elected president of the Fire Chiefs' Club of Massachusetts, and Mayor Coughlin, of Fall River, was the guest of honor at the annual meeting held at the Copley Square Hotel, Boston. The club accepted an invitation to take part in Marlboro's twenty-fifth anniversary on June 20. Chiefs T. F. Murnane of Fitchburg and Thomas W. Lane of Manchester, N. H., were chosen vice-presidents; Captain William Brophy, of Jamaica Plain, was re-elected secretary and treasurer, and Chief F. O. Whitmarsh, of Braintree, was elected sergeant-at-arms.

Engineers' Society of Pennsylvania.—At the second annual convention, Harrisburg, June 1-4, the following programme will be carried out:

Wednesday, June 1.—9.30 a. m.—Opening of the manufacturers' exhibition at Exhibition Hall, Cameron st. above State st. Address by the Mayor of Harrisburg. 10.30 a. m.—Convention called to order in the House of Representatives. Address by Chairman Jackson, of the convention. 11.30 a. m.—Meeting of the County Chairmen, Senate caucus room, State Capitol. 1.30 p. m.—Illustrated lecture, entitled "The Improvement of the Highways of America," Logan Waller Page, Director Bureau of Highways, Agricultural Department, Washington, D. C. 2.00 p. m.—Tour of inspection by ladies, of Capitol, museum and conservatories. 2.30 p. m.—Address by President Reynolders, of the Engineers' Society of Pennsylvania. 2.45 p. m.—Address by Governor Edwin S. Stuart. 3.00 p. m.—Business meeting of the convention. Report of Code Committee. 8.00 p. m.—Smoker at the Board of Trade. Lunch, cigars and vaudeville. 8.00 p. m.—Illustrated lecture to ladies, on "Color Photography," by J. Horace McFarland, at Mt. Pleasant Press Lecture Hall.

Thursday, June 2.—9.00 a. m.—Illustrated lecture, entitled "Road Work in Pennsylvania and Some of Its Problems," Joseph W. Hunter, Pennsylvania State Highway Commissioner. 10.00 a. m.—Ladies' inspection of manufacturers' exhibit. 10.30 a. m.—Illustrated lecture, entitled "Melville-MacAlpine Reduction Gear," J. A. MacMurchie. 12.30 p. m.—Afternoon devoted to inspection of exhibits. Luncheon may be had at the manufacturers' exhibit. 1.30 p. m.—Luncheon to non-resident members' wives at Country Club. 8.00 p. m.—Banquet at the Board of Trade. Ten five-minute talks by well-known engineers, including the presidents of the four large engineering societies of Pennsylvania. 8.00 p. m.—Concert for ladies by Orpheus Club, in Fahnstock Hall.

Friday, June 3.—9.00 a. m.—Illustrated lecture, entitled "Power Engineering and Producer Gas," Nisbet Latta. 9 a. m.—Automobile tour for non-resident members' wives. 10.30 a. m.—Illustrated lecture, entitled "Illumination," Dr. Clayton H. Sharpe, Director of the Electrical Testing Laboratories of New York. 1.30 p. m.—Illustrated lecture, entitled "Aviation," speaker to be announced. 2.30 p. m.—Vaudeville for ladies at Paxtang Park. 3.00 p. m.—Final business meeting. Discussion of code. 8.00 p. m.—Illustrated lecture, entitled "Sanitation," Samuel G. Dixon, M.D., LL.D., State Commissioner of Health. Music in the rotunda of the Capitol before and after the lecture.

Saturday, June 4.—9.30 a. m.—Excursion by special train on Pennsylvania Railroad to the Pennsylvania Water and Power Company, McCall Ferry, 135,000 H. P. hydro-electric plant, fifty miles below Harrisburg, on the Susquehanna River, returning at 5 p. m. Lunch served en route. All lecture and business meetings will be held in the House of Representatives, at the Capitol.

The industrial exhibit will be one of the most important features of the convention. The hall in which it will be held is 75 feet by 360 feet, divided into seventy-seven booths, and the exhibits will cover all kinds of engineering features, tools, materials and instruments. The exhibit will be opened by the Mayor of Harrisburg, who will make a brief address, and it will be open continuously throughout the first three days of the convention. The afternoon of Thursday, June 2, will be devoted to an inspection of the exhibits, no lectures or other meetings being held. Special cars will carry convention members free of charge from hotels, railroad stations and Capitol Building to the exhibit hall.

Cumberland Valley Firemen's Association.—At the ninth annual convention of the association, Hagerstown, Md., May 18, the following officers were elected: President, Edward B. Munson, of Hagerstown, by acclamation; first vice-president, J. F. Goss, Winchester; second vice-president, Lester S. Etter, of Chambersburg; third vice-president, Martin Quinn, Martinsburg; secretary, A. E. Gordon, Waynesboro; treasurer, W. H. Richter, Chambersburg.

Michigan State Good Roads Association.—At the convention, May 13, officers were chosen as follows: President, Philip T. Colgrove, Hastings; vice-president, N. P. Hull, Diamondale; secretary and treasurer, Thomas M. Sattler, Jackson. Horatio S. Earle and W. W. Todd, the former president, will act with the officers as executive and legislative committees. Dr. F. C. Warnshuis, of the Michigan Club, pledged the aid of the automobilists for good roads, and Alvah W. Brown offered a resolution in favor of legislation to tax automobiles 25 cents per horsepower, the money to go into the good roads fund of the county in which it is paid and also increasing the good roads tax from 10 to 25 cents. That this could not be done under the constitution, as it would be in the nature of a special tax, was pointed out by Philip T. Colgrove and R. D. Graham, and the matter was referred to the legislative committee to see what could be done. Mr. Brown said the automobilists favor good roads and are willing to build them. F. A. Ely, State Highway Commissioner, in his address favored the idea of using prison labor in road-making, which had been suggested by President Todd in his morning address. Mr. Ely said the present road law is good, encouraging permanent construction in all parts of the State. Governor Warner reviewed the good roads movement in the State and said the time will come when three or four times the present amount will be expended and a tax of less than 10 cents on the thousand valuation will make this possible, with benefit to both city and country. President Bachelder, of the National Grange, in a letter to the Board of Trade, said: "I enclose copy of speech by Senator J. H. Bandhead, of Alabama, which includes a favorable report by the Senate committee on agriculture on Senate bill No. 6931, providing for an appropriation of \$500,000 for the extension of the work of the United States office of public roads in aiding in the improvement of the public highways. The enactment of this bill will result in widespread and permanent reforms in the present methods of public highway construction and maintenance, under which it is estimated that of the \$90,000,000 annually expended for road improvement, at least one-half, or \$45,000,000, is practically wasted, through lack of knowledge on the part of the local road authorities. The greater part of this money could be saved by giving these local officials the benefit of expert advice and assistance by the trained engineers of a properly equipped office of public roads, and it is with this object in view that the proposed appropriation is sought."

Municipal League of Los Angeles.—New officers were elected at the annual meeting as follows: J. O. Koepfli, president; James A. Anderson, first vice-president; R. W. Burnham, second vice-president; H. R. Boynton, treasurer. The new executive committee consists of the officers named, with the addition of Marshall Stimson, J. W. Whittington, Martin Bekins, Frank Simpson, A. L. Stetson, Louis Lichtenberger, B. N. Coffman, Dr. Elbert Wing, Tracey C. Becker, Louis W. Myers and Willard Arnott. President James A. Anderson reviewed the work of the league for the twelve months just closed, and called attention to the fact that the membership now is about 1,000. The most important work of the year was the league's initiation of the ordinance creating the new Board of Public Utilities.

Good Roads Association of Indiana.—Definite plans were laid and a permanent organization was effected of representatives of northern Indiana counties, looking to the improvement of public roads in this State, at a good roads congress, held May 19, in the Oliver Hotel, under the direction of the South Bend Chamber of Commerce. With a large representation of public officials of northern Indiana counties present, a movement was launched, which, it is believed, will transform the roads of this section from a condition described as unpardonably bad to the best in the country. Confronted at the outset with the fact that a concerted plan of road improvement is possible only after new legislation is enacted, the chief business of the congress consisted in forming a competent and able organization to put into effect the ideas and plans which will be evolved by the congress of the future. To this end a committee on permanent organization was appointed to nominate officers and appoint committees. Cadmus Crabill, chairman of the city neighbors' sub-committee of the municipal affairs committee of the Chamber of Commerce, in which committee the idea of the road congress originated, was made temporary chairman, and Mr. Smith, of Elkhart, temporary secretary. The committee on organization consisted of a representative of each county, represented at the morning session, including Dr. A. G. Schlicks, Lake County; Mayor W. F. Spooner, Valparaiso, Porter County; Mayor Lemuel Darrow, Laporte County; H. P. Miller, St. Joseph County; L. D. Hall, Elkhart; C. M. Wolker, Marshall County; G. Kratli, Starke County. The recommendations of the committee on permanent organization, which were concurred in by the congress, were as follows: President, Hon. Aaron Jones; vice-presidents, Mayor Lemuel Darrow, of Laporte, and Mayor E. M. Chester, of Elkhart; secretary and treasurer, Cadmus Crabill. The board of directors will consist of one member from each county, to be selected by the Board of County Commissioners of each county, upon the recommendations of the Chamber of Commerce, or business men's organization of the county. The board of directors will elect an executive committee, which, with the officers, will effect the permanent organization further and appoint committees.

American Institute of Electrical Engineers.—At the annual meeting on May 17 the following officers were elected for the ensuing year: President, Prof. Dugald C. Jackson, Boston; vice-presidents, P. H. Thomas, New York; H. W. Buck, New York, and Prof. Morgan Brooks, Urbana, Ill.; managers, H. H. Barnes, New York; C. E. Scribner, Chicago; W. S. Rugg, New York, and R. G. Black, Toronto; treasurer, George A. Hamilton, Elizabeth, N. J.; secretary, Ralph W. Pope, New York.

Southwestern Electrical and Gas Association.—The sixth annual convention was held at Beaumont, Texas, May 13-14. Following are the officers elected for the ensuing year: W. B. Tuttle, San Antonio, president; Joe E. Carroll, Beaumont, first vice-president; E. T. Moore, Dallas, second vice-president; D. G. Fisher, third vice-president; W. B. Head, Stephenville, secretary; A. E. Judge, Tyler, treasurer. Houston, Tex., was selected as the next meeting place. The membership is made up of officers and employees of lighting companies, and practical questions of management were dealt with.

Engineers' Club of Youngstown, O.—At the meeting, June 20, a report was received from the committee on Youngstown water supply. It was to the effect that the Milton site as chosen by the city officials was by no means suitable to supply all the needs of the people. An additional reservoir at some point nearer the city would be needed where the water could be conducted direct to the filter plant without being obliged to pass down the river past the mills in the valley. An interesting and instructive paper contributed by the Carnegie Steel Company, on the result of the recent Government tests of furnace slag as a substitute for stone in the construction of good roads, with special reference to the road put in on Bella Vista avenue, west of the city, was read and discussed. The subject of concrete construction will be discussed at the next meeting, June 2, and a paper on the use of concrete will be read by A. J. Boehme, of the Youngstown Sheet and Tube Company. At the meeting for June 16 Messrs. E. S. Smith and E. C. Banister will give a joint paper on "Good Roads Materials and Construction."

Society of German Engineers.—An illustrated pamphlet of 47 pages has been issued by the "Verein Deutscher Ingenieure," the famous German engineering society, with headquarters at Berlin. It gives a history of the organization and traces its growth in the past fifty-four years. The pamphlet is issued primarily for distribution at the World's Exposition at Brussels. The rapid growth of the organization, particularly in the last fifteen years, is shown by a graphic chart. The founders were twenty-three engineers who met at Alexisbad, in the Hartz, Germany, May 12, 1856. To-day there are more than 1,000 members for every one of the founders. The total, May 1, 1910, was 23,592. It was planned from the beginning that branch or district organizations should be formed and there are now forty-seven of these.

Illinois Association of Mayors.—The convention met at Armory Hall, Cairo, May 18-19, where they were welcomed by Mayor Parsons. President Mayor Joseph E. Paden, Evanston, responded. The following papers were presented: "Finances and Accounting of Cities," Hon. Edward J. James, president of the University of Illinois; "Public Service Corporations and Their Control," Mayor W. C. Rawleigh, of Freeport; "Enforcement of Ordinances," Hon. E. S. McDonald, ex-Mayor of Decatur; "Public Health and Sanitation," Dr. M. A. Evans, Health Commissioner of Chicago; "The Construction, Repair and Maintenance of Pavements," Clarke E. Andrews, City Engineer of Moline; "Duties of Public Officials," Mayor Silas Cook, of East St. Louis. The following officers were elected: President, Joseph E. Paden, of Evanston; vice-president, W. T. Rawleigh, Freeport; treasurer, F. M. Marsteller, Geneva; secretary, George H. Anderson, Elgin; directors, E. S. McDonald, Decatur; George Parsons, Cairo; Albert Fehrman, Elgin; George S. Schnepp, Springfield; E. N. Woodruff, Peoria; John H. Howard, Lake Bluff; Silas Cook, East St. Louis; George W. McCaskin, Rock Island; A. R. Hendricks, Sterling; S. A. Frazier, Centralia; Mark Jardine, Rockford; S. H. Greeley, Winnetka. The next annual meeting will be held in Peoria. The convention adopted a resolution asking the Legislature to give the cities the same power over all public utilities that they now have over water works.

Chiefs of Police and City Marshals of Texas.—The sixteenth annual meeting was held at Sherman May 18-19. The meeting was called together by President Fred Long. Mayor John C. Wall delivered an address of welcome, to which James H. Maddox, Fort Worth, responded. Officers were elected as follows: John R. Brown, Chief of Police of Weatherford, president; Chief Henry De Spain, of Sherman, first vice-president; Chief W. H. Perrett, of Galveston, second vice-president; Chief Hollis Barron, of Waco, third vice-president; M. T. Forrest, of Galveston, secretary and treasurer, this making the seventh consecutive time he has been elected to the place; Arthur Forrest, of Galveston, sergeant-at-arms; City Marshal Sam Harris, of Farmersville, mascot. Fort Worth was chosen as the next meeting place. The principal topics discussed at the meeting were the juvenile and vagrancy laws.

Calendar of Meetings

June 7-11.

Playground Association of America.—Fourth annual congress, Rochester, N. Y. H. S. Braucher, Secretary, 1 Madison avenue, New York City.

June 9-11.

National Association of Comptrollers and Accounting Officers.—Fifth annual convention, Hotel Astor, New York City.

June 21-24.

American Society of Civil Engineers.—Annual Convention, Chicago, Ill.—Charles Warren Hunt, Secretary, 220 W. 57th st., New York City.

June 22.

New England Water Works Association.—June Outing, Providence, R. I.—Willard Kent, Secretary, Narragansett Pier, R. I.

June 21-23.

Indiana Municipal League.—Annual Convention, Richmond, Ind.—Baltz A. Bescher, Secretary, Richmond, Ind.

June 22-24.

American Institute of Chemical Engineers.—Semi-annual Meeting, Niagara Falls, N. Y.—J. C. Olsen, Secretary, Polytechnic Institute, Brooklyn, N. Y.

June 23-25.

Society for the Promotion of Engineering Education.—Annual Meeting, Madison, Wis.—Henry H. Norris, Secretary, Cornell University, Ithaca, N. Y.

June 27-30.

American Institute of Electrical Engineers.—Annual Convention, Jefferson, N. H.—R. W. Pope, Secretary, 33 West 39th st., New York City.

June 28-July 2.

American Society for Testing Materials.—Annual Meeting, Atlantic City, N. J.—Edgar Marking, Secretary, University of Pennsylvania, Philadelphia, Pa.

June 30-July 1.

American Society of Heating and Ventilating Engineers.—Semi-annual Meeting, St. Louis, Mo.—W. M. Mackay, Secretary, P. O. Box 1818, New York, N. Y.

July 26-27.

Western New York Volunteer Firemen's Association.—Tenth Annual Convention, Lockport. Charles F. Foley, Secretary, Lockport, N. Y.

August 17-20.

National Firemen's Association.—Thirteenth Annual Convention, Rochester, N. Y. Bert Fisher, Secretary, 3812 Wabash ave., Chicago, Ill.

August 23-26.

League of American Municipalities.—Annual Convention, St. Paul, Minn.—John MacVicar, Secretary, City Hall, Des Moines, Ia.

August 23-26.

International Association of Fire Engineers.—Annual Convention, Syracuse, N. Y.—James McFall, Secretary, Roanoke, Va.

September 21-23.

New England Water Works Association.—Annual Meeting, Rochester, N. Y.—Willard Kent, Secretary, Narragansett Pier, R. I.

October 11-16.

American Society of Municipal Improvements.—Seventeenth Annual Convention, Erie, Pa.—A. Prescott Folwell, Secretary, 239 W. 39th St., New York, N. Y.

November 14-18.

National Municipal League.—Annual Meeting, Buffalo, N. Y. Clinton Rogers Woodruff, Secretary, North American Building, Philadelphia, Pa.

PERSONALS

ANDERSON, DR. KATHLEEN, Tacoma, Wash., has been chosen as City Chemist and Bacteriologist by Mayor A. V. Fawcett, and for \$95 per month will perform the duties heretofore assigned to City Chemist E. O. Heinrich and City Bacteriologist H. J. Hards, who received \$150 and \$75 per month, respectively.

BENZENBERG, GEO. H., formerly City Engineer of Milwaukee, has been retained as a consulting expert to assist the municipal officials in providing for a better filtration system at Pittsburgh, Pa.

BUTHS, JOSEPH, Hartford, Conn., has been elected President of the Street Board.

COGAR, R. QUINN, Midway, Ky., has been elected Chief of the Fire Department by Council, vice Dr. Joseph S. Lehman, resigned, and James S. Starks, Assistant Chief.

CUSHING, GEORGE, Chief of the Fire Department of Hingham, Mass., for 32 years, has been reappointed by the Board of Selectmen.

CROSBY, COL. SPENCER, Lieut.-Col. Biddle and Lieut.-Col. Harry Taylor, all Engineer Officers, United States Army, have been appointed a board to meet in Washington to attend a hearing before the Secretary of the Interior on the question of the vacation of a permit to San Francisco to use the Hitch Hichy Valley for a water supply.

DAVISON, C. W., San Jose, Cal., has been re-elected Mayor over F. A. Curtis.

DOOLEY, CAPT. T. S., Park City, Tenn., has been elected Councilman-at-Large over John M. Dailey at the city's second municipal election, and will be chosen as Mayor by the new Council, the other members of which are: Dr. S. H. Keener, George W. Fox, Claude Fitzgerald, George M. Stevens, T. D. Bailey, Charles M. Wilson, W. A. Davis and Orin C. Beaman.

DULIN, R. S., Portland, Ore., has been appointed City Chemist by City Engineer Morris with the approval of Mayor Simon.

ELEY, ARCHIE J., Los Angeles, Cal., has been appointed Chief of the Fire Department.

FUERTES, JAMES H., New York, N. Y., has been engaged by the Common Council of Plainfield, N. J., to make an investigation in view of the acquisition of an adequate water supply.

GIBBS, ISAAC, JR., Masseys, Md., has been appointed Road Engineer.

GRONER, H. F., Tacoma, Wash., who has been assistant to Frank C. Kelsey in designing the city's new Nisqually electric power plant, has been appointed Chief Engineer of the project, to succeed his chief, who resigned when the salary was reduced from \$500 to \$250 per month; he has had 18 years' experience and worked on the Stone & Webster power plant at Electron at the same time as Nicholas Lawson, the new Commissioner of Public Works of the city.

HANBERG, JOHN J., Commissioner of Public Works of Chicago, Ill., has resigned, and Bernard J. Mullaney, Secretary to Mayor F. A. Busse, has been appointed to the position and confirmed with a salary of \$10,000 per year; Mr. Hanberg was criticized by the Merriam investigation commission for his administration of the office.

HERMANS, E. J., City Engineer of Chehalis, Wash., has been removed by Council by a vote of 4 to 3, after much strife; in two years the office has been held by Hermans, W. H. Allen and again Hermans.

HUMPHREY, E. N., New Britain, Conn., Mr. Downes and John Moore have been appointed to the Board of Public Works by Mayor Halloran.

KELLOGG, ALBA H., Newburgh, N. Y., has been appointed Superintendent of the Fire Alarm System.

KRUECHTEN, JOHN, ex-Mayor of Cincinnati; O., has been elected President of the Board of Health.

LEWIS, NELSON P., New York, N. Y., Chief Engineer Board of Estimate and Apportionment, will deliver an address at the eleventh annual commencement exercises Thomas S. Clarkson School of Technology, Potsdam, N. Y., June 16, 11 a. m.

MACKENZIE, WM. A., Bridgeport, Conn., has been recently appointed Engineer and Superintendent of the Wallingford Water Works and also Borough Engineer of Wallingford, Conn.

MARTIN, A. A., Gilroy, Cal., has been elected Mayor.

MEYER, DR. L. A., Oconomowoc, Wis., Gustav Schueble, John Pearson, George Wing and C. L. Kellogg have been appointed Fire and Police Commissioners by Mayor B. G. Edgerton.

MORAN, SIMON F., Wilmington, Del., has been elected Chief of the Fire Department by members, and John W. Porter and John M. Townsend, First and Second Assistants, succeeding Chief Robert C. Porter and his assistants, Patrick Magill and Edward A. McNally.

NOAH, WILLIAM, Mayor of Kosciusko, Miss., has been re-elected over C. E. Morgan, the Aldermen elected being W. D. Musslewhite, J. H. Hollingsworth, J. D. Boswell, J. W. Rimmer and J. W. Fletcher.

OLDERSHAW, FRANK H., City Engineer of New Britain, Conn., has been re-elected by the Board of Public Works; also M. P. O'Brien, Superintendent of Sewers, and Albert H. Gammerdinger, Clerk of the Board.

PERKINS, CHARLES E., Columbus, O., has retired from his position as Chief Engineer of Public Works of the State of Ohio, and has opened an office for the practice of civil engineering at Akron, O. Mr. Perkins has served 18 years in the position he has just left.

REES, CAPT. SAM, Assistant Chief of the Fire Department of Louisville, Ky., has been presented with a handsome gold fire badge studded with rubies and a large diamond, Congressman Sherley making the presentation at a meeting of friends of Capt. Rees.

RUCKER, DR. W. COLBY, United States Public Health and Marine Hospital Service, has been appointed Health Commissioner of Milwaukee by Mayor Emil Seidel.

SHOECRAFT, ELLSWORTH, Coldwater, Mich., has become City Engineer of La Porte, Ind.

SKINNER, JOHN F., Rochester, N. Y., Assistant City Engineer, delivered an address before the Men's Civic Club, Rochester, May 19, on "Sewage Disposal," with special reference to the local problem.

SMITH, CHANNING, Rochdale, Mass., Everett Carleton and E. J. Titcomb have been appointed Commissioners of the newly organized Cherry Valley and Rochdale Water District.

SMITH, W. H., Fayetteville, N. C., has been promoted to Chief of Police from the ranks, vice Chief Monaghan, who declined to stand for re-election.

TEHAN, JOSEPH, Auburn, N. Y., has been appointed First Assistant City Engineer, his name being the only one on the eligible list certified to by City Engineer Aldrich.

MUNICIPAL APPLIANCES



KYANIZED WOODEN WALK HALF-CENTURY OLD

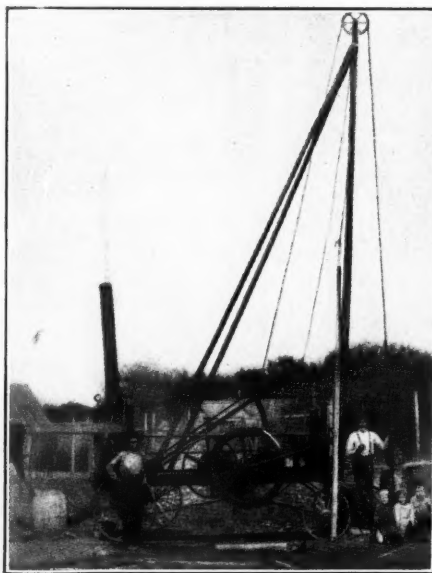
Kyanized Spruce

At their saw mills at Berlin, N. H., the Berlin Mills Company, 256 Broadway, New York, maintain a large kyanizing works, where they are prepared to treat all kinds of lumber in any quantity. The process of impregnating wood with a solution of bichloride of mercury was first introduced in 1832 by Kyan and is known, from its inventor, as the kyanizing process. Since 1840 this process has been in constant and successful use in the United States. In practice it consists in steeping the timber in a solution of bichloride of mercury by the open tank cold-bath method. While in application it is comparatively simple, it is of the highest importance that the process be faithfully and honestly applied with proper facilities coupled with experience. Kyanizing does not change the wood in color nor affect its strength and general properties, but leaves it less inflammable than in its natural state, and with a clean surface that will take paint if desired. The value of the kyanizing process lies in the fact that bichloride of mercury is the most powerful antiseptic, germicide and fungicide known. In the application of the process a chemical combination takes place between the bichloride of mercury and the albuminous particles or sap of the wood, forming antiseptic and insoluble salts in the cells or pores of the wood which effectually preserve it from rot. These antiseptic and insoluble salts formed in the wood being neither volatile nor soluble do not escape and leave the wood unprotected when exposed to the air or damp and wet surroundings. An instance of the durability of wood treated by this process is shown in the illustration. It shows a plank walk alongside the old gate house at the overflow of the Northern canal, Pawtucket street, Lowell, Mass., built in 1848. Although the planks are worn from constant use, every one of them is now perfectly sound and as good as the first day they were put in place.

Drilling with Wire Rope

DRILLING with wire rope was for a long time thought impractical, but by carefully studying the need of different ropes used around the drill hole, manufacturers are now able to produce ropes that are practical, and the Manila rope is fast falling behind. The several ropes that are used are all made different, both in manner of making and in material, and there is even a difference between the drilling rope and the sand line. The driller must himself decide just what kind of rope is best adapted for his purpose, and must use such dis-

cretion, for, even though wire rope is used so much more than before, it is not always the best to use. Much care has to be taken not to kink a wire rope as it weakens it at that point and it is apt to break with hard usage, and it is sometimes very difficult to handle in very shallow holes, but it has many advantages and many times it is absolutely necessary to use it. Where the water is running very freely in the drill hole, a much harder blow can be struck by using a wire rope than with the Manila rope. This is due to several things. First, Manila rope having a specific gravity of about .4 has a tendency to float, and retards the drop of the tools, and consequently the force of the blow, and for this reason will also cause it to go more slowly and necessitate the loss of much time. Wire rope has a specific gravity of 8; it goes



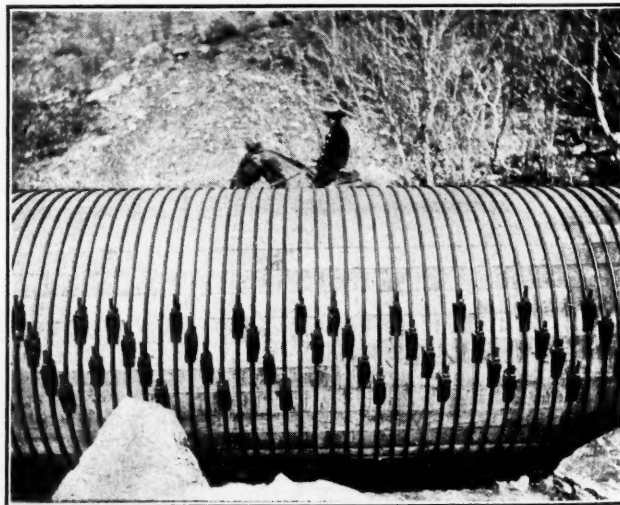
CHRISTMAN DRILLING OUTFIT

through the water with the same speed as the tools, giving the tools the full force of their impact, and this goes to show that the speed of drilling can be materially increased. Many instances have been known where it was impossible to drill with Manila rope in a wet hole, and where very little difficulty was experienced with the wire rope; and second, the diameter of the wire rope being much smaller than the Manila rope, the friction in passing through the water is much less. If the spool on a machine will only hold a certain number of feet of Manila rope, and the driller wishes to go deeper, he can use wire rope for the balance of the distance down and use his machine that would have only gone as far as the number of feet that the spool could allow. With the Christman Drilling Machine, shown in the illustration, it is

not necessary to attach several hundred feet of Manila rope to the bottom of the wire rope in order to give it elasticity, as with the worm feed operated by hand wheel at the front of the machine, the driller is, at all times, able to get proper adjustment of the slack. It is possible at any time to take up or let out the tools with ease, by turning the hand wheel in the proper direction. It also obviates the tendency of the wire rope to crystallize, as the rope can be kept perfectly tight at all times. With this machine the driller can use ordinary rope sockets. It also does away with the special rope clamps, springs, clips or other devices for holding the rope. This machine is made by Edward Christman, Massillon, O.

Wooden Stave Pipe

ALTHOUGH the first use of wooden pipe of the present day type is of comparative recent date, bored logs were extensively used by our forefathers for carrying water under pressure. These log pipes, however, were made in small sizes, not exceeding four or five inches in diameter. Necessity developed the type of wooden pipe now being built, known as "continuous stave pipe," which is widely used in irrigation, penstocks for hydro-electric developments and municipal water supply, and is built in sizes from ten inches to ten feet, and more, in diameter. This pipe is made up of a sufficient number of staves to complete the circle of desired diameter, each stave being "saw-kerfed" at the ends. In these saw-kerfs, or slots, are seated metallic tongues, which, when the staves are "driven back," form a tight butt joint. The seam joint between staves are made tight by banding the pipe with round steel rods, varying in size from three-eighths to one inch in diameter, depending on the size of the pipe. Each rod is made a complete band by means of a malleable iron shoe, or lug, engaging the headed and threaded ends, nut and washer of the rod. So many structures have existed for years, depending for their stability on wooden piles or grillage placed below "low water mark" that it is accepted as a truth "wood kept saturated with water will not rot." Therefore, under ordinary conditions, the life of continuous stave pipe, when kept constantly full, its staves saturated, becomes the life of the steel bands encircling it. The life of the steel bands can be greatly prolonged if the metal is covered with some protective coating. It is therefore



STEEL BANDS AND SHOES ON WOOD STAVE PIPE

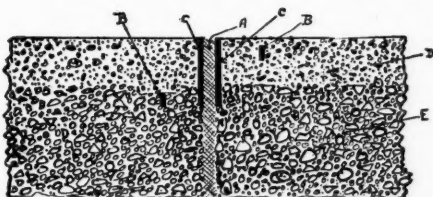
of the utmost importance that this coating, to prevent corrosion, should be selected and applied in as careful a manner as economically possible.

Shirley Baker, Am. Soc. C. E., Manager Pipe Department, Redwood Manufacturers' Company, San Francisco, states that during the last six years, on the construction of a number of wooden pipe lines under his supervision, "Pioneer" Mineral Rubber Pipe Coating has been very successfully used as a hot dip for coating the bands, and "Pioneer" Field Paint as a cold application for retouching spots that become abraded during construction, both these materials being manufactured by the American Asphaltum & Rubber Company, of Chicago.

Steel-Protected Expansion Joints

AN improvement in the construction of concrete pavements has been invented and placed on the market by the R. D. Baker Co., Detroit, Mich. This company manufactures steel plates shaped to conform to the crown of a streets. These are inserted in the expansion joints and tied to the concrete and wearing surface. In this way crumbling at the joints of a concrete pavement, a tendency which is considered as its most serious fault, is minimized or prevented. The specifications for making armored expansion joints are as follows:

Expansion joints one-half inch wide



PROTECTED JOINT IN CONCRETE PAVEMENT

shall be made wherever necessary to provide for expansion and contraction. Expansion joints to be filled with No. 6 pitch or other approved material. At intervals of twenty-five feet expansion joints will be provided extending from curb to curb. Where pavement comes in contact with street car or other tracks, expansion joints shall be made at the end of ties to provide for vibration caused by the jar of passing cars. All expansion joints are to be armored and sharp edges protected against abrasion by means of angles or 1/4-inch steel plates, 3 inches wide, provided with shear members which tie them securely to concrete base and wearing surface. These are clamped to a dividing board shaped to conform to the crown of the street. After pavement has been finished, the dividing board must be removed and opening covered with tar paper until filled with No. 6 paving pitch or other specified material.

The lower cut shows the construction of the steel plate. Naum strips are cut from the plate, some near the top and others alternating with them at the bottom. These are bent at right angles with the plate, the upper ones forming a bond with the surface mixture of the pavement and the lower ones with the base. The ends of these strips—B, B—are shown in the upper cut.



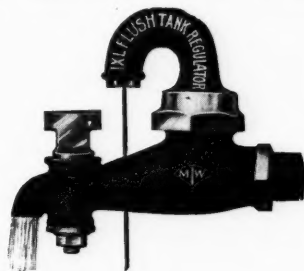
STEEL PLATE FOR PROTECTING JOINTS IN CONCRETE PAVEMENTS

Flush Tank Regulator

THE IXL Flush Tank Regulator is a device for controlling the supply of water to flush tanks to meet the requirement of economy and insure a constant supply of a small quantity of water without danger of clogging the small orifice.

The IXL Flush Tank Regulator is screwed on to the end of the supply pipe coming from the water main, just inside the tank. The water enters the main chamber and must rise vertically through the fine perforated brass screen in the union connection, pass through the return bend at the top, and is discharged downward through the cone-pointed bronze plug.

The hole in this bronze plug is

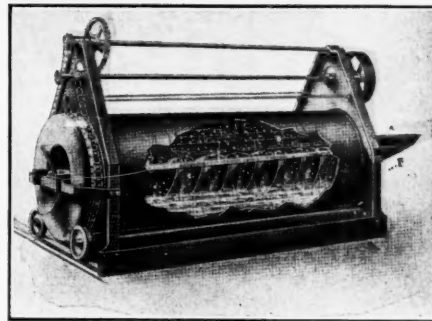


made in various sizes to discharge any amount of water in a given time under a given pressure.

The lower part of the main chamber constitutes a receptacle for the sediment and foreign matter caught by the screen above. To the outer end is a blow-off cock for the purpose of blowing off this sediment at times, also for use in quickly filling the tanks when inspecting same. The device is manufactured by the Modern Iron Works, Quincy, Ill.

Gravel and Sand Washer

ECONOMICAL supplies of gravel and sand are often accessible to the contractor, but the amount of clay or other fine material prohibits their use. In some localities it is necessary to pay twice as much for sand or gravel as a near supply would cost. A machine suitable for washing such sand, gravel or stone has been placed on the market by the Stocker Concrete Material Washer Company, Highland, Ill. The machine is also suitable for installation in a bank of ordinary quality material where the local market demands a perfectly clean product, as for some classes of cement work. It is claimed that the machine will wash 75 tons of material in ten hours when it carries 20 per cent of clay by the use of from ten to fifteen gallons of water per minute. If water is scarce or expensive, settling basins can be installed as a part of the plant and the same water used repeatedly. The washer is all metal, the end frames are cast iron, the revolving drum is of No. 16 sheet steel, on the inside of the drum are riveted angle iron bars, to which steel strips are riveted, forming an elevator carrying the material to the upper part of the drum, whence it drops into steel chutes, which are stationary and at fixed angle, conveying the material forward; from the chute it falls into water at bottom of the drum, is taken up by the elevator and dropped into the next chute, and so on until the

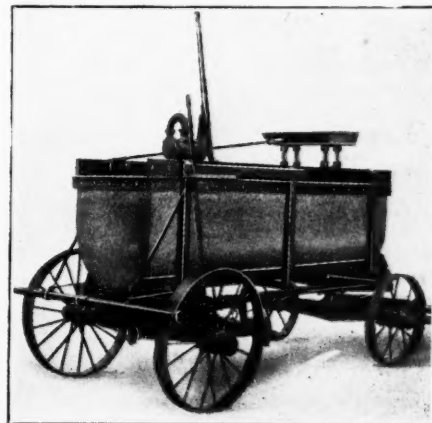


CONCRETE MATERIAL WASHER

washed material finally is discharged from the last chute. See letter "D" in cut. The clean water enters at the discharge end of the drum, see letter "E." Passing through the drum in opposite direction and against the material, discharging at "F" over flaring flange, permitting the water to flow into trough. The drum is about eight feet long and 30 inches in diameter. The base of the frame is of angle iron 4 x 6. A 2 1/2-hp. gasoline engine will supply sufficient power and the floor space occupied is 3 1/2 x 10 ft.; weight of washer, 1,700 pounds. A larger machine, No. 4, is made which has a drum 45 inches in diameter and 12 feet long. Its capacity is from 200 to 300 tons per day of 10 hours.

Tar Spreader

A SIMPLE and substantial tar spreader is made by the Huber Manufacturing Company, Marion, O. It consists of a steel tank with rounded bottom,



TAR SPREADING WAGON

mounted on a suitable track. A perforated pipe in the rear spreads the tar or oil. A small centrifugal pump operated by hand makes the problem of charging the tank from barrels easy and economical.

Metal Culverts

METAL culverts which are claimed to have merits both on account of their construction and material are manufactured under the trade name "Acme" by the Canton Culvert Company. The culverts are made of corrugated sheets, 26 inches in width over all. In setting up there is an overlap of one corrugation and joints are broken as there are two half lengths in each culvert. Two common laborers can set up from one hundred and fifty to two hundred feet of this culvert in a day, or an ordinary culvert in an hour or so. The material of which they are made is a specially prepared iron, far superior in rust-resisting properties to steel and even old-fashioned iron.

TRADE NOTES

Cast Iron Pipe, Chicago.—There is a fair run of orders from small cities and towns. Gas companies are ordering freely, but the railroad demand for culvert pipe is light. Quotations: 4-inch, \$28.50; 6 to 12-inch, \$27.50; 16-inch and up, \$26.50. Birmingham.—The aggregate of business continues satisfactory. Quotations: 4 to 6-inch, \$24; 8 to 12-inch, \$23; over 12-inch, average, \$22. New York.—General demand for small quantities of pipe is good. Market is steady. Quotations: 6-inch, \$25.50 to \$26. Lead.—Market is steady. Quotations: New York, 4.45c.; St. Louis, 4.20c.

Contracting Company.—The contracting firm of Westwater & Casey, of Columbus, Ohio, has been dissolved, but the greater part of its staff has been retained by a new firm, James Westwater & Co., with offices in the Wyandotte Building, Columbus. The firm will not only carry on a general contracting business, but will also conduct a consulting engineering department, which will be under the charge of Mr. R. S. Jones, formerly engineer for Westwater & Casey, on the construction of filtration plants at Columbus, Ohio, and Pittsburg, Pa.

Deep-Well Pump.—Among important contracts recently awarded the Keystone Driller Company, main office and plant Beaver Falls, Pa., is one from the town of Caledonia, Minn., for installing a large-size, double-stroke, deep-well pump in a well which has been drilled to a depth of 405 feet. The Keystone Driller Company manufactures portable well-drilling and prospecting machines, Downie deep-well pumps, etc., and maintains branch offices at 170 Broadway, New York, and Monadnock Block, Chicago.

Wire Rope.—The American Steel and Wire Co., Chicago, Ill., has revised its price lists and tables of standard strengths. The method of measuring breaking strengths has heretofore been based upon the individual wires in the rope. For the first time the figures of breaking strengths based upon the average of the different sizes and kinds of wire rope, as obtained by actual tests on a large number of specimens, are published, and these figures now represent the standard adopted by all makers of wire rope in the United States. In no case have the intrinsic strengths been reduced, the new method being adopted to meet the desire for more convenient and direct figures.

Police Hats.—M. C. Lilly & Co., Columbus, O., have supplied the spring hats for the Police Department of Leavenworth, Kan.

Gas Engines.—The Power Equipment Co., Minneapolis, Minn., has had liberal inquiries of late for the Smith suction gas producers and Foos gas engines which it is handling, indicating a growing interest among power users of the Northwest in plants of that character. Other concerns offering similar apparatus report the same experience.

Steam Rollers.—The Port Huron Engine & Thresher Co., Port Huron, Mich., is finding one of its best markets this year on the Pacific Coast, where it is represented by Henshaw, Bulkley & Co., San Francisco. Heavy steam rollers are in good demand there, owing to the general movement in that section toward effecting permanent road improvement.

Road Machinery.—The Town Board of Grand Rapids, Mich., has placed an order for \$3,548 worth of new road machinery. The machinery consists of a 60-horsepower J. I. Case freighter traction engine, water tank and eight reversible dump wagons. Mr. Nesbitt, chairman of the board, presented the figures showing that the use of this machinery will effect a saving of some \$40 per day. He states that the cost of operating would be about \$20 per day, and that for a haul of from four to six miles, such as a team would make two trips a day, twenty-four yards of dirt could be moved with this machinery. Mr. Nesbitt also contends that the machinery could be used for other purposes and even leased out to other towns or to contractors, and a goodly amount realized from the rentals.

Rust-Proofing.—The Bradley Rust-Proofing Company, 35-37 Ferris street, Brooklyn, N. Y., has equipped a plant to work under J. J. Bradley's patents, and is now prepared to treat articles of wrought iron, gray and malleable castings, steel stampings, drop forgings, etc., to resist rust. The Bradley process is a hydrogen gas treatment. The article to be rust-proofed is placed in a muffle, where it comes in contact with hydrogen gas and other materials necessary to the process, and is then subjected to heat. This changes the surface, forming an alloy which resists the action of oxygen in air or water. This process can be used on bolts, nuts or other threaded articles, as there is no interference with the threads, which is one of the drawbacks of plating of any kind. In addition to the rust-proofing, the articles which are treated are benefited by the careful cooling, which anneals them. The process cannot be used on hardened or tempered pieces, because of the heat. The color obtained is a dark, rich, blue black, well adapted for builders' hardware or for other articles of a highly finished character.

Road Machinery.—The Port Huron Engine and Thresher Works, Port Huron, Mich., suffered considerable damage by fire May 16, its boiler and sheet iron departments being practically destroyed and much of its machinery was a total loss. Rapid work was done in repairing such damaged parts as could be put in shape, and the company was fortunate enough to procure new equipment, so that work is now being done under temporary arrangements.

Water Softening.—The Wm. B. Scaife & Sons Co., Pittsburg, Pa., reports an unusually large volume of business in water softening and purifying systems. Among some of its recent orders for the We-Fu-Go system are the following: American Sheet & Tin Plate Co., Vandergrift, Pa., 15,000 hp.; River Furnace & Dock Co., Cleveland, Ohio, 6,000 hp.; New York & New England Cement & Lime Co., Hudson, N. Y., 8,500 hp.; Spencer, Kellogg & Sons, Buffalo, N. Y., 1,500 hp.

Meters.—The activity in water works construction and extension has crowded the works of the Pittsburg Meter Co., in East Pittsburg, Pa., with orders for every type of meter used. A feature of the trade is the growth of the demand for apparatus to be used in connection with large, swiftly flowing volumes of water, as the influence of exact measurement and records in determining the economy of industrial operations where water is required, as in ore construction, mill service, etc., is coming to be better appreciated.

Steel Wagons.—An all-steel wagon for contractors' use is being manufactured at Grand Rapids, Wis., by the F. MacKinnon Mfg. Co., whose production thus far this year has broken all previous records.

Paving Brick.—The North Collins Shale Brick Co. is building a plant at North Collins, N. Y., for the manufacture of paving and building brick. It is understood that most of the equipment has been provided.

Superheaters.—The Power Specialty Co., 111 Broadway, New York, N. Y., has removed its Chicago office from The Rookery to the People's Gas Building to secure better accommodations for handling its increased business. The office is in charge of R. B. Nutting, manager, and R. H. Wyld, assistant manager. The volume of Foster superheater sales is increasing rapidly, the contracts secured so far this year nearly equaling the total of last year's business.

Paving Brick.—The Jamestown Shale Brick Co., Jamestown, N. Y., is making a large addition to its plant, and among the improvements will be side-track connections with the Erie Railroad.

Power Houses.—The Public Service Corporation, Newark, N. J., will build a power house at Perth Amboy, N. J., to develop current for light and power delivered throughout Middlesex County. The size of the proposed plant has not yet been entirely decided upon.

Concrete Mixer Wanted.—The McCully Construction Company, St. Louis, Mo., is in the market for a concrete mixer and a clam shell bucket.

Bottom Dump Wagons.—The Watson Wagon Company, A. A. Kessler, president, Canastota, N. Y., manufacturer of dumping wagons, is having plans prepared for an additional factory building, 51 x 240 ft., also for two double dry kilns, and for an office building 30 x 60 ft., brick, concrete and steel construction.

Steel Forms.—The Interlocking Steel Form Company, 925 Unity Bldg., Chicago, recently incorporated with a capital stock of \$50,000, is negotiating for a site upon which it will erect a factory for manufacturing steel tubes to be used in the construction of breakwaters, piers, docks and building and bridge foundations. Machinery to be installed in the plant will consist of shears, rolls and punches, and will be operated by electric motors.

Natural Gas Association.—The annual convention was held at Oklahoma City, May 17-19. The officers elected were as follows: President, John W. Gerard, of Columbus, Ohio; vice-president, W. A. B. McBeth, of Independence, Kan.; secretary-treasurer, Thomas O. Jones, of Delaware, Ohio; Eastern director, W. H. Hammond, of Pittsburg, Pa.; Western director, M. M. Sweetman, of Kansas City. Pittsburg was chosen as the next meeting place. Papers were presented covering every phase of natural gas and the various fields now under development. New appliances and the various economies in the production and distribution of gas were also discussed. Prof. C. N. Gould, Oklahoma Geological Survey, said that the quantity of gas already discovered in Oklahoma is between one and a half and three billion cubic feet daily. He declared that only a small part of the gas field of the State had been explored, and yet it was the greatest in the world and estimated the life of the field at 100 years.

THE WEEK'S CONTRACT NEWS

Relating to Municipal and Public Work—Street Improvements—Paving, Road Making, Cleaning and Sprinkling—Sewerage, Water Supply and Public Lighting—Fire Equipment and Supplies—Bridges and Street Railways—Sanitation, Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also corrections of any errors discovered.

STREET IMPROVEMENTS

Andalusia, Ala.—Covington county will expend \$17,000 for road improvements.

Little Rock, Ark.—E. A. Kingsley, Superintendent of Public Works, has estimated cost of paving West 23d st., from Main to Wolfe st., at \$52,000.—Carl Voss, Chairman West 23d st. Improvement District.

Gibsonville, Cal.—County Commissioners are considering repair of county road between this city and Johnstown.

Long Beach, Cal.—Contract will soon be let for constructing 30-ft. cement walk and protecting bulkhead along west beach boulevard; cost, \$100,000.

Long Beach, Cal.—Plans have been completed by City Engineer for grading and graveling of Seaside Boulevard; cost, \$107,000.

Oakland, Cal.—Bids have been ordered readvertised for resurfacing E. 12th st. with standard asphalt.

San Diego, Cal.—Council has decided to construct cement sidewalks on Georgia, Ivy and 26th sts.

Denver, Colo.—State Highway Commission is considering construction of state highway from this city to Fort Collins, a distance of 75 miles.—Thorndike Deland, Secretary of Chamber of Commerce, is also interested.

Bridgeport, Conn.—Street Committee has recommended that paving on Fairfield Ave. be relaid.

Bristol, Conn.—Borough Board is considering street curbing and sidewalks on number of streets.

Hartford, Conn.—Finance Board is favorable to macadamizing of several streets at cost of \$3,000.

Jacksonville, Fla.—County Commissioners have instructed County Engineer Gail L. Barnard to at once pave Lincoln ave.

San Mateo, Fla.—Putnam county has asked bids for construction of two miles of hard-surfaced roads.—R. F. Ensey, County Engineer, Palatka.

Rome, Ga.—Board of Public Works will provide for permanent curbing on number of streets.

Decatur, Ill.—Board of Public Improvements has decided to pave Marietta st.; cost \$18,156.30.

East St. Louis, Ill.—Board of Local Improvements has decided to pave portion Converse ave.; cost, \$26,000, and Parsons ave., \$6,700.

Joliet, Ill.—Bids have been advertised for pavement on Blackburn st.

Indianapolis, Ind.—Board of Public Works has adopted two improvement resolutions.

River Park, Ind.—Town Board has decided to improve Vine st.

Lyons, Ia.—City is considering creosote block or brick paving on Main st.; cost, about \$20,000.—R. C. Hart, Clinton, Engineer.

Manchester, Ia.—Council has decided to pave Franklin st. with cement at estimated cost of \$1.25 per yd.

Topeka, Kan.—City Commissioners have authorized grading, paving, curbing and guttering of Kenwood ave. at cost of \$39,000.

Lexington, Ky.—Bids will soon be advertised for reconstruction of S. Limestone st. with wooden blocks, asphalt, brick or bitulithic.

Owensboro, Ky.—Council is considering oiling of dirt streets in city.—Address Mayor Lambert.

Shreveport, La.—City will expend \$600,000 for street paving; material undecided.—G. R. Wilson, City Engineer.

Chestertown, Md.—Commissioners have passed ordinance requiring all future pavements to be made of concrete.

Gloucester, Mass.—Widening of Essex ave. is being considered.

Lawrence, Mass.—Bids will soon be asked for paving three streets and portions of two others with Philadelphia, Boston and Hassam blocks, with and without sand foundation.

Lowell, Mass.—Street Committee has recommended that \$21,600 be expended for macadamizing ten streets; also extension of Wilder st.

Ann Arbor, Mich.—City is considering laying of 15,000 sq. yds. of concrete pavement.—E. W. Graves, City Engineer.

Bay City, Mich.—Board of Works has recommended \$17,000 bond issue for sidewalks and sewers.

Hancock, Mich.—Superintendent of Public Works Foley has recommended laying of 4,000 ft. of sidewalks.

Monroe, Mich.—Citizens will vote on \$15,000 bonds for paving.

Crookston, Minn.—Council will pass ordinance for paving of 20 blocks; asphalt is favored.

Agricultural College, Miss.—Executive Committee has rejected bids for construction of 1½ miles of macadam road.—A. J. Moore, Secretary Mississippi Agricultural and Mechanical College, is interested.

Macon, Miss.—City is considering construction of 1 mile of macadam road.—Chas. Strong, Mayor.

Kansas City, Mo.—Park Board has adopted resolution to repave Independence blvd. with creosote blocks, bitulithic or other durable material.

Laconia, N. H.—Council is considering \$4,500 appropriation for permanent improvements at Bank square and \$3,650 for macadam road in Ward 6.

Cranford, N. J.—Township Committee is considering macadamizing of 6th st.

Keyport, N. J.—Council has decided to improve sidewalks; flag and concrete will be used.

Newark, N. J.—Board of Public Works will consider paving of Broad st.

Newburgh, N. Y.—Council is considering paving of Grand st. with sheet asphalt.

Penn Yan, N. Y.—John E. Watkins and J. Monroe Lown of this village have been appointed commissioners for the purpose of laying out highway between West Italy, Yates County, and Naples, Ontario County.

Rochester, N. Y.—Ordinances are being considered for paving of following streets: Erison st., pavement, \$4,500; Davis st., pavement, \$14,000; Frank st., pavement, \$22,000; Thorpe st., pavement, \$7,500; Winton road, pavement, \$11,500; Spruce ave., pavement, \$22,000; Earl st., pavement, \$14,500; Exchange st., pavement, \$25,000; Weaver st., pavement, \$23,000; Seward st., extension, \$15,000; University ave., extension, \$17,000.

Rome, N. Y.—Bids have been ordered advertised for paving E. Willett and Elm sts.; materials undecided.

Syracuse, N. Y.—Contract will soon be awarded for paving Danforth st.

Utica, N. Y.—Oneida County will oil 32 miles of State road.—Address State Highway Inspector Hodges.

Watertown, N. Y.—Bids will be received about June 17 for paving High st. with vitr. block, asphalt or bituminous macadam; cost, about \$20,000.—E. W. Sayles, City Engineer.

Cincinnati, O.—Hamilton County Board of Commissioners has decided to have center of the Montgomery pike paved with granite; cost, about \$53,380.—Stanley Struble, President.

Columbus, O.—City will issue \$54,000 bonds for paving eight streets and construction of sewer.

Mansfield, O.—Council is considering improvement of Hellen ave. and W. 5th st.

Youngstown, O.—Bids will be received June 20, 2 p. m. for \$1,200. Mahoning ave. widening and \$2,500 repaving bonds; \$17,945 Forest ave. paving bonds, \$4,000 Lincoln Park and \$970 sewer bonds.—W. I. Davies, Auditor.

Cherokee, Okla.—City is considering paving of principal business streets.

Butler, Pa.—Council has passed ordinances for paving six streets.

Chester, Pa.—Council has adopted bill 113, providing for paving of roadways of certain streets.

Erie, Pa.—Geo. H. Kimble, Detroit, will prepare plans for solving grade-crossing problem.

Sayre, Pa.—Paving of portion of two business streets is being considered.

Westerly, R. I.—Cost of cutting down Union st. has been estimated at \$24,530.

Edgefield, S. C.—Town is considering better streets.—Dr. J. G. Edwards, Mayor.

Greenville, S. C.—City has selected H. S.

Jaudon, Savannah, Ga., as Consulting Engineer for street and sidewalk paving.

Alvito, Tex.—Citizens will vote June 10 on \$12,000 bonds for street improvements.

Colorado, Tex.—Election on sidewalk proposition is being considered.

Dallas, Tex.—Residents of North Haskell ave. are urging bitulithic paving on that thoroughfare.

El Paso, Tex.—Council is considering paving of Rio Grande st.

Hillsboro, Tex.—Citizens are planning paving of streets.

Waco, Tex.—Ordinances have been passed by Commissioners providing for 20 miles of cement sidewalks.

Ogden, Utah.—Weber County will expend \$1,800 in improving and maintaining roads.

Provo, Utah.—Mayor Ray has recommended paving of 24 blocks.

Martinsville, Va.—Board of Supervisors has refused to ratify contract of committee made with R. G. Rand for macadamizing public road from Martinsville to Mulberry Creek, and new bids will be received.

Spottsylvania, Va.—Bids have been rejected by County Commissioners for proposed road work.

Chehalis, Wash.—Council has decided to improve following streets: Market, \$23,000; Chehalis ave., \$37,000, and Folsom, \$25,000; material undecided.

Dayton, Wash.—Council has passed ordinance creating sidewalk paving district on 1st st.

Spokane, Wash.—Board of Public Works has filed request with Council that they be allowed to let contracts for grading, curbing, paving and sidewalk certain streets; cost \$60,950.

Burlington, Wis.—City is considering paving of several streets with concrete.—H. E. Zimmerman, Mayor.

Burr Oak, Wis.—Citizens are urging construction of a macadam road or modern hard road from Melrose to this city; distance about 22 miles; cost about \$3,000 per mile.

East Troy, Wis.—Town is considering street paving.—Alderman Albert Ebert is interested.

Fond du Lac, Wis.—City will build two miles of cement pavement.

North Fond du Lac, Wis.—Village Council has ordered graveling of two avenues and Ohio st.

Racine, Wis.—Council has adopted ordinance for paving 12th st.

Superior, Wisc.—Bids will be received about June 14 for proposed steel plant road to be built by county.

Medicine Hat, Alta, Can.—Ratepayers have voted \$20,000 for street-making machinery, \$30,000 for cement walks, \$55,000 for plank walks and \$35,000 for sewers.

Nanaimo, B. C., Can.—Tenders will be received for the construction of from four to eight miles of concrete sidewalks.—Allan Walters, City Engineer.

Victoria, B. C., Can.—Specifications are being prepared for proposed pavements.—Angus Smith, City Engineer.

CONTRACTS AWARDED

Huntsville, Ala.—Paving Church st., to Bloom Block Paving Co., \$40,000.

Phoenix, Ariz.—First section of the Prescott Phoenix territorial road, from Prescott to Mount Union Summit, to Johnson & Shea, Riverside.

Tucson, Ariz.—Paving, to Concrete Construction Co., \$9,000.

San Fernando, Cal.—Constructing 13½ miles of asphalt road, to Barber Asphalt Co., \$35,000 per mile.

Stockton, Cal.—Constructing roads, bids opened May 14, as follows: to Cotton Bros. & Co., Oakland, Aramp-Lockeford road, \$33,660, and to Moreing & Son, city, Lodi and Woodbridge roads, \$7,202.

Denver, Col.—Paving in Alley Paving Districts Nos. 18 and 19, to Municipal Construction Co., \$13,331 and \$15,227, respectively.

Winsted, Conn.—Macadam road in North Canaan, 34,000 ft., to John Dusen London, \$1.35 per lin. ft. for macadam, \$1.65 for telford and 90c. for rubble drain.

Wilmington, Del.—Constructing various State roads, to Commonwealth Construction

Co., New York, Naaman Creek road, \$21,969.54, local stone; State road, from Kent County line northwest, distance two miles, \$13,153, Knickerbocker limestone; Mt. Pleasant to Maryland line, nearly four miles, \$27,550, Birdsboro trappe rock, and from Boyd's Corner toward Port Penn, distance about one mile, Birdsboro rock, about \$11,505; all to Steuart & Donohue.

Coeur D'Alene, Ida.—Grading and curbing streets in residence section and paving business section, to Inland Empire Hassam Paving Co., Portland, \$175,000.

Jacksonville, Ill.—Paving W. College st. with asphalt, to Standard Paving Co., 145 La Salle st., Chicago, \$17,810.

Pana, Ill.—Street paving, 25,637 sq. yds., to John Cherry, Jacksonville, \$1,54; curbing 13,856 lin. ft., 55c.; other bidders, John Bretz, Springfield, \$1.59; U. Wolb, Alton, \$1.64, 64c.; Illinois Cement Co., Springfield, \$1.63, 45c.; Ewing Shields, Seymour, Ind., \$1.69, 52c.; Harry Stanton, City Clerk.

Kentland, Ind.—Building 30 miles macadam roads, Washington Township, to Jacob Ackerman, South Bend, \$62,200.

Mishawaka, Ind.—Paving Mill st., to Western Const. Co., Lafayette, \$9,419.

Fort Scott, Kan.—Paving Oak st., to Thogmartin & Gardiner.

Louisville, Ky.—Paving as follows: to Marlon County Construction Co. of Indianapolis, Ind., four streets, \$1.85 per sq. yd., total \$20,000; to Barber Asphalt Paving Co., 347 5th st., \$1.97 per sq. yd.; total \$40,000.

Patterson, La.—Laying 700 sq. yds. concrete walks, to C. F. Barber, Morgan City.

Baltimore, Md.—Constructing 3½ miles of road, Kennedyville to Locust Grove, Kent Co., to Juniata Paving Co., \$33,047.

Boston, Mass.—Paving Charles st. with granite blocks, to Coleman Bros., \$25,392.50.

Bovey, Mich.—Widening road, to A. A. Mitchell, \$3,500.

Ironwood, Mich.—Paving 20,120 sq. yds. with macadam, to P. McDonnell, Duluth, Minn., \$1.99; other bidder, Chris. Johnson, Oshkosh, Wis., total bid \$41,044.80; cement sidewalks, 40,000 sq. ft., to Peter Lofberg, 10c. per sq. ft.

Marquette, Mich.—Roads, to James Oxman, Ironwood, \$9,306 for constructing four miles; to John Hanousek, Ramsey, \$4,922, two miles, Bessemer Township; Henry Poykonen, \$1,700, one mile, and Andrew Katanen, \$1,600, one mile.

Red Wing, Minn.—Paving Broad and Levee sts., to T. W. Quinn, Madison, Wis., about \$20,000.

South St. Paul, Minn.—Macadamizing Concord st., to Thornton Bros., St. Paul, \$9,017.

Branchville, N. J.—Bldg. 3.27 miles of macadam road, to Irving Demarest, Seawarren, \$23,705.80; native rock will be used.

East Orange, N. J.—Paving, bids opened May 9, as follows: to Hastings Pavement Co., asphalt block pavement, \$52,000, and to Standard Bitulithic Co., bitulithic pavement, \$57,000.

Elizabeth, N. J.—Bldg. four county roads, 8½ miles, to Weldon Construction Co., Rahway, \$150,371.72.

Westfield, N. J.—Laying 20,100 sq. yds. macadam, bids opened May 16, to Weldon Contracting Co., Rahway, \$33,084.

Las Cruces, N. M.—Grading and paving Alameda road, to O. H. Brown, \$3,260.

Penn Yan, N. Y.—Paving with brick, Elm st., to Chas. N. Kelly, city, \$13,640.

Port Jervis, N. Y.—Paving Pike and Front sts. and New Jersey ave., to Mulderr Bros., as follows: 8630 sq. yds. Clearfield field 6-in. concrete foundation, \$1.99; 800 lin. ft. curb reset, 30c.; 3000 lin. ft. new curb, 4 x 20-in., 58c.; 340 lin. ft. protection curb, 40c.; 3500 cu. yds. excav., 40c.; total cost, \$23,809.—Irving Righter, City Engineer.

Rome, N. Y.—Paving Floyd ave. and Stanwix st., to Warren Bros., \$23,075.38 and \$8,243.35.

Cincinnati, O.—Improving Beechwood ave., to M. Sullivan & Sons, \$5,360.60.

Portland, Ore.—Paving E. 11th st., to Oregon Hassam Paving Co., \$90,572.

Chester, Pa.—Improving Shoemakerville hill, to Herman Dickerson, \$1.35 per sq. yd. for Amiesite; crushed stone will cost \$1.65 per ton.

Lansdowne, Pa.—Paving Baltimore ave., to United Paving Co., Atlantic City.

Butler, Pa.—Paving Negley ave., to Tony Morrell, brick, \$1.09; curb, 49c., excavating, 24c., and pitch filling, 12c.

Hazleton, Pa.—Paving three streets, to J. A. Leffler, Laurel st., Watsontown brick, \$4,075.99; Church st., same material, \$6,726; Mine st., Mack brick, \$1,544. Sidewalks, to T. A. Williams.

Memphis, Tenn.—Paving Rayburn blvd. and McLemore ave. with asphalt, to Barber Asphalt Co., Philadelphia, Pa.; cost, including grading, concrete base, surface and other incidental work, \$44,432.

Galveston, Tex.—Building 34 miles of roads, to J. C. Kelso, \$150,657.

Provo, Utah.—Cement sidewalks, to Wheelwright Construction Co., \$12,800.

Olympia, Wash.—Bldg. State roads, to Ilse and Elliott, Spokane; cost about \$100,000.

Seattle, Wash.—Asphalt paving on Hunter blvd., to P. J. McHugh, \$15,005; concrete walks on E. 66th st., to same contractor, \$13,315; concrete sidewalks on N. and E. 57th st., to Packard, Spink & Co., \$12,763, and concrete walks on W. Stevens st., to Joe Frank & Co., \$22,339.

Sultan, Wash.—Grading Beach and 5th sts., to P. E. Cunningham, \$1,704.30 and \$4,799.

Snohomish, Wash.—Grading, curbing and sidewalk 4th st., across city, to McDermott & Driscoll; Concrete walks, 14c. per sq. ft.; curb, 54c. per lin. ft.; excavation, 35c. per yd.; total, \$13,949.83; other bidder, Contractor Kenyon of Bremerton, \$14,076.20; street intersections same rate; crossings to be 17c. per sq. ft.

Tacoma, Wash.—Paving, to Barber Asphalt Paving Co., \$50,264; other bidders, Independent Asphalt Paving Co., \$51,443; Warner Bros., \$54,500; Anderson Construction Co., \$56,696; B. W. Kibler, \$58,600; N. A. Jones, \$56,333; Coast Contracting Co., \$52,190.

De Pere, Wis.—Paving George st., to McGrath Construction Co., Green Bay, 50c. per lin. ft. for curbing, \$1.38 for pavement, \$37.50 catch basins, and \$25 rebuilding same.

Superior, Wis.—Filling in approaches to Tower ave. bridge, to John J. Shea, \$1,721.

Beith, Que., Can.—Building eight miles of macadam roads, bids opened May 10, to O'Connor Bros., Huntingdon, Que., \$23,800.

Vernon, B. C., Can.—Sidewalk construction, to Worswick Paving Co., Ltd.

BIDS RECEIVED

New Haven, Conn.—Paving, Highland st., to Thomas F. Maher, \$1,696; Lawrence O'Brien, \$2,371.50; Joseph B. Whitby, \$2,767.50, and Dwyer & Mannix, \$2,588. Chatham st., to Joseph B. Whitby, \$675; Lawrence O'Brien, \$837; Dwyer & Mannix, \$726, and Thomas F. Maher, \$691.50. Truman st., to Thomas F. Maher, \$4,830; Ryan-Unmack Co., \$5,278.50; Dwyer & Mannix, \$5,017.50, and Lawrence O'Brien, \$6,147.50. Pond st., to Dwyer & Mannix, \$945; Joseph B. Whitby, \$995; Thomas F. Maher, \$1,025, and Lawrence O'Brien, \$1,167.50. Goffe st., to Dwyer & Mannix, \$515; Joseph B. Whitby, \$575; Thomas F. Maher, \$544, and Lawrence O'Brien, \$688.50. State st. and Rock road, to Thomas F. Maher, \$2,085; Lawrence O'Brien, \$2,750, and Dwyer & Mannix, \$2,195.

Wilmington, Del.—State road from Kent County two miles northward, Horrigan Contracting Co., granite, \$16,433.06; Birdsboro, \$16,221.86; amiesite top, \$23,755.06; tar binder, \$22,335.06; limestone, \$16,151.46. John A. Clark, same road, Laxley, \$15,255; granite, \$15,720; Birdsboro, \$15,477; amiesite, \$23,337; asphaltum top, \$19,847; tar binder, \$20,552; limestone, \$16,100. B. F. Wickersham, same road, macadam, \$15,318.50; amiesite, \$25,590; asphalt, \$24,470; tar binder, \$24,470; limestone, \$14,614.50. Stewart & Donohue, same road, granite, \$13,153; amiesite, \$18,896; asphalt, \$21,520; tar binder, \$21,552; limestone, \$13,747; Birdsboro, \$13,914. Juniata Paving Co., same road, asphaltum, \$17,367.60; limestone, \$15,959.

Boyd's Corner to Port Penn, Horrigan Contracting Co., macadam, \$13,825.25; Birdsboro, \$13,709.90; amiesite, \$19,705.50; asphaltum, \$16,477.10; tar binder, \$16,477.10; limestone, \$13,479.30. John A. Clark, same road, macadam, \$12,880; Birdsboro, \$13,050; amiesite, \$19,350; tar binder, \$17,100; limestone, \$13,700. Stewart & Donohue, same road, granite, \$10,555; amiesite, \$14,411; asphaltum, \$15,586; tar binder, \$15,588; limestone, \$11,112. Commonwealth Construction Co., same road, macadam, \$13,701.96; asphaltum, \$20,965.86; tar binder, \$20,965.86.

Mount Pleasant to Maryland line, Horrigan Contracting Co., granite macadam, \$23,050.50; Birdsboro, \$32,556.58; amiesite, \$49,541.50; limestone, \$29,618.26; tar binder, \$41,456.18. Juniata Paving Co., same road, macadam, \$29,010.56; asphaltum, \$37,447.68; limestone, \$34,015.28. John A. Clark, same road, macadam, \$28,143; Birdsboro, \$28,578; limestone, \$30,143; tar binder, \$38,466. Stewart & Donohue, same road, macadam, \$25,948; amiesite, \$35,265; asphaltum, \$38,671; tar binder, \$38,671; limestone, \$27,015.

Naaman's Creek road, John F. O'Neill, granite macadam, \$25,990. Corkran Construction Co., same road, macadam, \$20,108; asphaltum, \$33,608; tar binder, \$33,608. Horrigan Contracting Co., same road, macadam, \$28,559.52; asphaltum, \$38,531.52; tar binder, \$38,531.52; limestone, \$33,297.02; amiesite, \$46,010.10. Nelson Meredith Co., same road, macadam, \$27,920.53. B. F. Wickersham, same road, macadam, \$27,590.76; amiesite, \$44,580; asphaltum, \$42,583; tar binder, \$42,600. Stewart & Donohue, same road, macadam, \$28,090; limestone, \$26,580. Commonwealth Construction Co., same road, macadam, \$21,696.54; asphaltum, \$27,430.44; tar binder, \$27,430.44.

Centerville, Ia.—Paving, (a) 25,930 sq. yds. brick paving, concrete base, 5-in. cement filler, 1½-in. sand cushion, including grading; (b) 4,000 cu. yds. extra grading; (c) 20,910 lin. ft. combined concrete curb and 24-in. gutter; (d) totals: M. Ford, Cedar Rapids, (a) 2,075, (b) 35c., (c) 55 c., (d) \$66,705; Cedar Rapids Construction Co., Cedar Rapids, (a) \$2,095, (b) 36 c., (c) 57c., (d) \$67,682; Northwestern Construction Co., Cedar Rapids, (a) \$2,14, (b) 36c., (c) 68c., (d) \$71,149; McGuire & Stanton, Leavenworth, Kan., (a) \$2.03, (b) 30c., (c) 52c., (d) \$64,711.

New Orleans, La.—Lake Shore sand, J. J. Clarke & Co., \$1 per cu. yd.; Jahneke Navigation Co., 90c.; refined asphalt, Texarcan Asphalt Co., \$25 per ton; Barber Asphalt Co., \$20 per ton; California Asphalt Co., \$23.70; American Asphalt and Rubber Co., \$21.73.

Highland Park, Mich.—Paving Woodward ave., brick, Baker & Baker, \$104,723; asphalt, \$110,381; F. Porath, \$115,651; J. A. Mercier, \$85,000 and \$87,000; Asphalt Block Paving Co., \$118,704; Central Bitulithic Co., sheet asphalt, \$111,685; bitulithic, \$130,687.75; creosote block, J. A. Mercier, \$119,112; J. Hanley, \$163,882 for creosoted block and \$121,309 for carbo via, T. E. Curry, \$143,254.

New York, N. Y.—Repaving with asphalt on a concrete foundation roadway of Berkeley ave., from 6th ave. to Plaza st.; Barber Asphalt Paving Co., 30 Church st., city, \$12,417; Uvalde Asphalt Paving Co., 1 Broadway, city, \$14,648; Cranford Co., 52 9th st., Brooklyn, \$13,789; Brooklyn Alcatraz Asphalt Paving Co., 407 Hamilton ave., Brooklyn, \$14,819. Lincoln pl., from Rochester ave. to Eastern Parkway; Uvalde Asphalt Paving Co., \$10,417; Barber Asphalt Paving Co., \$10,282; Cranford Co., \$10,508; Borough Asphalt Co., 1301 Metropolitan ave., Brooklyn, \$11,271. Bedford ave., between N. 12th st. and Manhattan ave.; Driggs ave., between N. 12th st. and Lorimer st.; Lorimer st., between Driggs ave. and Bayard st.; N. 12th st., between Bedford ave. and Union ave.; Union ave., between Roebing st. and Driggs ave.; Barber Asphalt Paving Co., \$29,039; Uvalde Asphalt Paving Co., \$32,591; Cranford Co., \$29,704; Borough Asphalt Co., \$30,682. 58th st., from 6th ave. to 7th ave., and 60th st., from 3d ave. to 4th ave.; Cranford Co., 52 9th st., Brooklyn, \$11,039; Barber Asphalt Paving Co., 30 Church st., New York, \$10,413; Brooklyn Alcatraz Asphalt Paving Co., 407 Hamilton st., Brooklyn, \$11,422; Uvalde Asphalt Paving Co., 1 Broadway, New York, \$11,961. 28th st. and 30th st., from 3d ave. to 5th ave.; Cranford Co., \$19,776; Barber Asphalt Paving Co., \$19,373; Brooklyn Alcatraz Asphalt Paving Co., \$20,726; Uvalde Asphalt Paving Co., \$21,545. McKibbin st. and Eleger st., from Bushwick ave. to White st.; Uvalde Asphalt Paving Co., \$12,802; Barber Asphalt Paving Co., \$12,283; Cranford Co., \$13,096; Borough Asphalt Paving Co., 1301 Metropolitan ave., Brooklyn, \$13,161. Delsmere pl., Mansfield pl., and E. 25th st., from Foster ave. to Farragut rd.; Barber Asphalt Paving Co., \$16,234; Uvalde Asphalt Paving Co., \$15,710; Cranford Co., \$15,380; Brooklyn Alcatraz Asphalt Paving Co., \$17,098. With granite, 3d st., from Smith st. to 5th ave.; Leo E. Kelly, 189 Montague st., Brooklyn, \$49,378; M. F. Hickey Co., 2d ave., Brooklyn, \$50,216. With granite, 10th st., from West st. to 9th ave.; Leo E. Kelly, 189 Montague st., Brooklyn, \$19,482; R. A. Russell, \$18,566; M. T. Maher, \$17,914; Williamson & Connell, \$19,227; Henry P. George, \$18,514; O'Grady Bros., 69 N. 8th st., Brooklyn, \$18,234. With same, Joralemon st., from Hicks st. to Furman st.; Leo E. Kelly, 189 Montague st., Brooklyn, \$10,582; Norton Gorman, \$10,119. Johnson ave., from Knickerbocker to Flushing ave.; H. P. George, \$42,884; Newman & Carey, 215 Montague st., \$41,177; Richard L. Russell, \$43,298; O'Grady Bros., \$47,078; Charles A. Meyers, \$38,904. Grand st., from Cooper st. to Bushwick ave.; H. P. George, \$37,789; Richard L. Russell, \$38,966; Matthew T. Maher, \$35,531.

St. George, S. I., N. Y.—Repaving with wood block pavement on concrete foundation roadway of Canal st., from City Dock to Broad st.; U. S. Wood Preserving Co., 165 Broadway, New York, \$26,298; Cornelius Vanderbilt, \$27,303; Lendine & Galle, \$29,849; Joseph Johnson's Sons, \$28,926; Barber Asphalt Paving Co., 30 Church st., New York, \$28,245; Uvalde Asphalt Paving Co., 1 Broadway, New York, \$27,466; D. Bonnacelli, \$29,238; Republic Construction Co., \$27,969.

Hazleton, Pa.—Paving of Laurel st., as follows: Jacob Jacoby, Mack brick, \$4,466.50; Ario Ruth, Mack brick, \$4,501; Ludwig Kramer, Mack brick, \$4,492.20; John A. Leffler, Mack brick, \$4,208.95; Toronto brick, \$4,208.95; Watsontown brick, \$4,075.99; Church st.: John A. Leffler, Mack brick, \$6,334; Toronto brick, \$6,334; Watsontown brick, \$6,126; Ario Ruth, Mack brick, \$6,802.75. Mine st., John A. Leffler, Ario Ruth, Jacob Jacoby and Ludwig Kramer bidders: Leffler's bids of \$1,544 on Mack

brick and \$1,488 on the Watson town brick were lowest. Sidewalks, etc., T. A. Williams, concrete paving, 7½c.; brick pavement, 13c.; gutters, 35c. John Probert also bid.

Scranton, Pa.—Paving, Webster ave. Brown & Co., \$2.21 per sq. yd.; MacDonald Co., \$2.20; A. G. Rosar, \$2.33; S. D. Martino, \$2.30; the estimated cost of this work is \$2,500. West Market st., McDonald Co., \$1.73; R. C. Ruthven, \$1.85; Warner-Quinlan, \$1.89; the estimated cost, \$8,600. Hickory st., McDonald Co., stone and asphalt, \$1.92; R. C. Ruthven, stone, \$2.35; asphalt, \$1.85; Warner-Quinlan, stone, \$2.75, asphalt, \$1.89. Green Ridge st., R. C. Ruthven, \$1.85; Warner-Quinlan, \$1.89; McDonald Co., \$2.15.

SEWERAGE

Oroville, Cal.—City has selected P. A. Haviland, Alameda, to superintend construction of local sewer system.

Roseville, Cal.—Citizens will vote June 26 on \$73,500 sewer bonds.

Brush, Col.—Town Board has decided to construct sewer system at estimated cost of \$50,000.

Golden, Col.—Plans will be prepared by the City Engineer for sewer system in Fourth Ward.

Bristol, Conn.—Borough Board has decided to construct sewers on six streets.

Wilmington, Del.—Board of Street and Sewer Directors is considering construction of sewer on 24th st.

Dade City, Fla.—Board of Trade will take up sewerage project.

St. Petersburg, Fla.—Election on bonds for sewer extension is being considered.

Atlanta, Ga.—Councilman Craig Canfield, Chairman Committee on Sewers, has asked for \$20,000 additional appropriation for sewers.

Marseilles, Ill.—Citizens have voted \$27,000 bonds for construction of a trunk line sewer.

Elkhart, Ind.—Board of Works has decided to build sewer on E. Jackson st.

Muncie, Ind.—Board of Works has ordered construction of storm sewer on two streets.—John Kelly, City Clerk.

Knoxville, Ia.—City will lay 5,000 ft. 8-in. sewer; contract soon.—Hall and Adams, Centerville, Engineers.

Seneca, Kan.—Plans have been completed by Engineers Burns & McDonnell, Scarrett bldg., Kansas City, Mo.; cost, \$30,000.

Topeka, Kan.—Plans for new sewer system are being prepared under the direction of Commissioner of Public Improvements W. G. Tandy.

Madisonville, Ky.—City is considering bond issue for proposed sewer and water works construction; correspondence desired with engineers. L. E. Ruby, Ruby Lumber Co., can be addressed.

Shreveport, La.—City will expend \$40,000 in constructing storm sewers.—Geo. R. Wilson, City Engineer.

Bangor, Me.—Council has ordered a preliminary survey and plan for construction of sewer on Larkin st.

Attleboro, Mass.—Committee on Sewerage has decided to employ Engineer Van Valkenburg to have charge of the engineering work of the sewage disposal system to be installed in this city.

Bay City, Mich.—City Engineer Wilhelm has estimated cost of extending 6th st. sewer at \$1,300; Board of Works has recommended \$17,000 bond issue for sewers and sidewalks.

Owosso, Mich.—Board of Works has recommended that the following sewers be constructed: Mulberry st., cost \$1,309; Pine st., \$609; Adams st., \$983; Water st., \$696; Washington st., \$1,461; Ball st., \$1,203; Park st., \$1,636; Saginaw st., \$1,630; East Main st., \$1,630; Washington st., north of Jeanette, \$2,177.

Springfield, Mo.—Mayor Robert E. Lee has instructed City Engineer Harry G. Horton to draw plans, specifications and estimate of costs of building septic tank at mouth of city sewer.

St. Louis, Mo.—Board of Public Improvements is considering establishment of Dale ave. joint sewer district and construction of sewer; cost \$85,000.

Windsor, Mo.—Arthur, Rolins & Co., Beals Bldg., Kansas City, Mo., are preparing plans for sewer system and water works; cost \$40,000.

Benson, Neb.—Council is considering resolution to have engineer draw up plans and estimate cost of installing sewer system.

Roosevelt, N. J.—City will issue \$5,000 bonds for extension of sewer system.

Geneva, N. Y.—City will expend \$166,600 for sewage disposal plant, reservoirs, etc.

Hempstead, N. Y.—Cyril E. Marshall, Hempstead Bank Bldg., has been selected by Village Trustees to make surveys and prepare plans and specifications for sewers and sewage disposal works.

Fargo, N. D.—City is considering number of sewer extensions.—F. L. Anders, City Engineer.

Bryan, O.—Riggs & Sherman Co., 613 Nasby Bldg., Toledo, have been selected as engineers for proposed sewage disposal plant.—F. W. Radabough, Clerk Board of Public Service.

Lancaster, O.—Council has instructed the City Engineer to prepare plans and specifications for proposed 6th ave. sewer.

Mansfield, O.—Council has passed ordinance for construction of 8-in. sanitary sewer in Franklin ave.

Cherokee, Okla.—City will complete sewerage system.—H. J. Titus, Mayor.

Dalles, Ore.—Citizens will vote June 20 on bonds for proposed sewer system.

Chambersburg, Pa.—Albright & Mebus, Philadelphia, are preparing preliminary survey and estimates for sewerage system and disposal plant.

Chester, Pa.—Sewer Committee has recommended that bids be asked for construction of sewers on Morton and Edwards sts.

Fulton, S. D.—Missouri Valley Eng. Co., of Mitchell, is making preliminary surveys for storm sewers.

Bryan, Tex.—City is considering \$100,000 expenditure for construction of sewer system, water works and electric light system.—J. C. Nagle, City Engineer.

El Paso, Tex.—Plans have been completed and bids will soon be advertised for construction of proposed sewage and garbage disposal plants; cost, \$100,000.

Charlottesville, Va.—City will construct 15,000 feet of sewers.—E. T. Caruthers, City Clerk.

Williamsburg, Va.—Robert A. Conard of Gordon & Conard, Maryland Bldg., Washington, D. C., will apply for franchise for water, sewerage and electric light systems.

Davenport, Wash.—Council has decided to employ engineer to prepare plans and estimates of cost of constructing sewer system.

Renton, Wash.—Council is considering construction of sewer system.

Grand Encampment, Wyo.—Citizens have voted \$10,000 bonds for construction of sewers.

CONTRACTS AWARDED

Morrilton Ark.—Constructing 3½ miles of sanitary sewer and septic tank, from plans by Lund & Hill, Little Rock, to Jos. McCoppin, Little Rock, \$14,500.

Dover, Del.—Sewer extensions to T. K. Jones & Bro. Co., \$1,200.

St. John, Kan.—Constructing sewers, bids opened May 20, to Marshall Bros., Las Animas, Col., \$34,315.—Burns & McDonnell, Kansas City, Mo., Engineers.

Westfield, Mass.—Furnishing about 7,300 lin. ft. 4 to 20-in. sewer pipe, to David W. Lewis Co., Boston.—Oren E. Parks, Town Engineer.

Eveleth, Minn.—Sewer system, three streets, to Northern Plumbing and Heating Co.; Douglas ave., earth excavation, 89c. per cu. yd.; rock excavation, 77c. per cu. yd.; 8-in. pipe, 12c. per ft.; 10-in. pipe, 20c. per ft.; 12-in. pipe, 35c. per ft.; manholes, \$62. Carrie ave. pipe line, 300 6-in. pipes, \$1.25 per ft.; hydrants, \$72. Pierce st. system, \$285.

Belzoni, Miss.—Construction of system of house sewers, to consist of about 3 or 4 miles of 8 and 10-in. pipe sewers, with centrifugal pump and motor, to Municipal Engineering and Construction Co., Chattanooga, Tenn.

St. Joseph, Mo.—Constructing section of the Blacksnake sewer, J. W. Hartman, city, about \$38,000.

Cranford, N. J.—Sewers to Louis Jaques, Elizabeth.

Perth Amboy, N. J.—Sewers, two streets, to John Jensen; Amboy ave., \$1.40 per lin. ft., manholes, \$30 each; Grove st., \$1.20 per lin. ft., manholes \$30 each and receiving basins, \$75 each.

Fairport, N. Y.—Extension of sewer on West ave., to Horace G. Cowles, Rochester.

Sanford, N. C.—Sewer system, to Edwards Construction Co., Hickory, including seven miles of pipe sewer from 8 to 20 in. diameter and concrete settling tank.—Gilbert C. White, Durham, Engineer.

Fargo, N. D.—Sewer on 1st st., to L. W. Schruth; 4th st., N., to G. W. Hoggart, and 5th st., to C. H. Barrett.

Dorrancetown, Pa.—Construction of sanitary sewers and appurtenances from plans of Smith & Welles, Coal Exchange, Wilkes Barre, to R. M. Rosser, Kingston, as follows: 10,660 ft. 8-in. sewer, 12c.; 1,720 ft. 10-in. sewer, 20c.; 300 ft. 12-in. sewer, 27½c.; 380 ft. 15-in. sewer, 37c.; 690 ft. 18-in. sewer, 50c.; 786 6x8-in. specials, 37½c.; 68 6x10-in., 61c.; 12 6x12-in., 77c.; 14 6x15-in., \$1.05; 24 6x18-in., \$1.25; 45 manholes, each \$35; 80 lamp shafts, ea. \$1.25; 24,000 ft. 6-in. house connections, 24c.; 1,548 ft. excavation and back fill, 20½c.; 21,403 ft. excavation and back fill, 20c.; to \$2.20; total, \$18,071, 120 days. Totals of other bids: Wm. Brown & Co., Duryea, \$27,334; Saupp & Drhew, Altoona, \$28,302; E. H. Post, Wilkesbarre, \$24,664; D. M. Rosser Engineering and Construction Co., Kingston,

\$22,032; Stephen Flanagan & Son, Scranton, \$26,801; B. G. Coon Construction Co., Wilkesbarre, \$19,820, and Westmoreland Construction Co., Greensburg, \$27,098.

West Hazleton, Pa.—Uncompleted Green Ridge sewer, to T. A. Williams, \$10,168.48.

Jackson, Tenn.—Sanitary sewers, including 722 ft. 16 and 6-in. c.i. pipe, 29,512 lin. ft. 6, 8, 12 and 15-in. terra cotta pipe, 600 terra cotta Y's, 105 Brick manholes, 10 flush tanks, etc., to Newnan Sewer Co., Evansville, Ind., \$26,277.

Oshkosh, Wis.—Sewer, to J. Rasmussen & Sons, about 6,585 ft. of sewer as follows: Doty st., \$1.05 per ft., 400 ft. of 20-in. sewer, 95c. per ft. for 300 ft. of 18-in. sewer, 75c. for 1,020 ft. of 15-in. sewer, and 61c. for 1,380 ft. of 12-in. sewer; Kentucky st., 85c.; 16th st., \$1.39, and Du'fee st., 85c.

Fernie, B. C., Can.—Supplying the city with 5 miles of sewer pipe and 2½ miles of water pipe, to William Dicken, at following prices for concrete pipe: 6-in., 25c.; 15-in., 70c.; 20-in., \$1.25; 24-in., \$1.70; 30-in., \$2.95; bulk tender, \$21,643.60. Other bulk tenders: Blackmer Post, St. Louis, Mo., \$23,670.72; H. H. Depew, Fernie, \$25,230.45. Mr. Dicken is the manager of the Western Canada Pressed Stone and Concrete Pipe Co.

BIDS RECEIVED

San Francisco, Cal.—Seventh and Howard st. sewers, Metropolis Construction Co., lowest bidder, \$165,000.

Boston, Mass.—Construction of Roslindale section of Stony Brook sewer conduit, C. R. Gow Co., lowest bidder, \$40,770.50; other bidders, Bryne Construction Co., \$42,091; McCarthy & Walsh, \$43,920.26; A. Cefalo, \$44,449.50; P. W. Hill, \$46,365; Luke D. Mullen, \$51,292; J. J. Falvey, \$52,917; J. H. Ferguson, \$57,507.60, and J. E. Palmer, \$74,272.

St. Louis, Mo.—First section, Baden sewer, Hoffman-Hogan Construction Co., lowest bidder, \$280,157.15.

Scranton, Pa.—Sewer, Twenty-second Ward, Robert P. Jones, \$1.43 per lin. ft.; William Bohn & Co., \$1.48; James J. Manley, \$1.68; Stephen Flanagan & Son, \$1.63; Bennett, Huggett, \$1.70; V. H. O'Hara, \$1.72.

WATER SUPPLY

Conway, Ark.—Guy A. Watkins of Dickinson & Watkins, Engineers, Little Rock, Ark., has recommended that city secure its supply for water works system from Cadron Creek, distance six miles.

Eureka Springs, Ark.—City proposes to expend \$50,000 for additional reservoir, new wells and extensions.

Fulton, Ark.—City is considering installation of water works system.

Nettleton, Ark.—Alexander Berger has applied for water works franchise.

Nevada City, Cal.—Northern Water & Power Co. will soon commence work on construction of Sawmill flat reservoir.

Oakland, Cal.—El Cerrito Water Co., Richmond, will commence work on 20,000-gal. reservoir on top of a hill in Nystrom tract and will sink several artesian wells in order to supply water to Cerrito and Nystrom tracts, City of Pullman, and the Seaver addition to Richmond.

San Francisco, Cal.—Water Commissioners have ordered purchase of 15 standard water gauges; also approved plan to lay auxiliary water pipe along 47th ave.

Vallejo, Cal.—Citizens will soon vote on bonds to provide 12,000,000-gal. distributing reservoir at Fleming Hall.

Alamosa, Colo.—Construction of water works is being considered.—W. G. Moffatt, City Clerk.

Carbondale, Colo.—Construction of water works is under consideration.

New Britain, Conn.—The Water Commissioners intend to install a large number of meters this summer.

Newark, Del.—Elk River Light, Heat & Power Co. has asked for franchise to furnish water and light to residential section.

Port Tampa, Fla.—Citizens will vote June 7 on \$25,000 bonds for installing water system.

St. Petersburg, Fla.—Election on bonds for extension and improvement of water works system is being considered.

Centralia, Ill.—Centralia Water Supply Co. has been incorporated, capital \$150,000, to furnish water supply; J. J. Bundy, C. C. Davis and C. D. Tufts, incorporators.

East Alton, Ill.—City is planning to build a water works system to afford fire protection.

Tremont, Ill.—Tremont Electric Co. has applied for franchise to supply town with water.

Red Oak, Ia.—Electric Light and Heating Co. will erect independent pumping plant for use in cases of emergency.

Silver City, Ia.—Business men have decided to petition Council for construction of water works.

Underwood, Ia.—Citizens will soon vote on installation of water works plant; surveys being made.

Topeka, Kan.—City Commissioners are planning to install another pump at city water plant; cost about \$35,000.—H. T. Miller, Commissioner of Water Works and Electric Lights.

Danville, Ky.—Ambursen Hydraulic Construction Co., 176 Federal st., Boston, Mass., is preparing plans for small water works dam for city.

Madisonville, Ky.—City is considering bond issue for proposed water works and sewer construction; correspondence desired with engineers.—L. E. Ruby, Ruby Lumber Co., can be addressed.

Hancock, Md.—Penniman & Fairley, 411 Marine Bank Bldg., 33 South Gay st., and J. Newman Numsen, Kate ave., are surveying for construction of water works.

Andover, Mass.—City has awarded \$16,000 water bonds and \$1,000 sewer bonds to E. H. Rollins & Sons.

Cherry Valley, Mass.—Cherry Valley and Rockdale Water Dist. will construct water works; cost 75,000.—Nathan E. Craig, Spencer, Engineer; Channing Smith, Cherry Valley, is interested.

Springfield, Mass.—Plans are being prepared for improvement of water supply system in Forest Park district.

Manistee, Mich.—City will at once improve water system at cost of \$10,000.

Saginaw, Mich.—Citizens will vote June 8 on installation of pumping station and filtration plant.

Belle Fourche, Minn.—State Engineer Lea has estimated cost for installing proposed water works plant at \$40,000.

Raymond, Minn.—Construction of water works, cost about \$6,000, is being considered.—A. Abrahamson, City Recorder.

Moberly, Mo.—City will extend water works system.—L. G. Knapp & Co., New York Life Bldg., Kansas City, Mo., Engineers.

Billings, Mont.—Park City Water Pipe Co. has been incorporated to supply residents of Park City with water; capital stock \$10,000.—B. M. Harris, J. W. Corwin, J. A. Russell, E. H. Wells and F. H. Young, Directors.

Helena, Mont.—Council has offered to buy present water works; if offer is rejected new plant will be constructed.

Rushville, Neb.—Town has voted \$15,000 bonds to improve and extend water system.

Winnebago, Neb.—Construction of additional pumping station on west side is being considered.

Collingswood, N. J.—Plans are being prepared by D. E. Roberts, 306 Lees ave., for system of water works and pumping station.

Dexter, N. M.—M. H. Elford is interested in proposed installation of well system.

Black River, N. Y.—State Water Supply Commission will consider plans for additional supply.

Geneva, N. Y.—City will spend \$166,600 for improvements of water service and supply and disposal of sewage; improvement includes general extension of water mains, filtering plant and reservoir.

Dayton, O.—Superintendent of Water Construction T. J. Heffernan has reported favorable to extension of water mains at cost of about \$6,902.

Newark, O.—Board of Public Service will lay about 8 miles of 6-in. water pipe in near future.

Port Clinton, O.—Board of Public Service is considering construction of filtration plant; cost \$25,000.

El Reno, Okla.—City will sell \$250,000 water and sewer bonds.

Eugene, Ore.—Citizens have voted \$60,000 bonds for construction of filter plant.

Conneaut Lake, Pa.—Citizens have voted to install complete system of water works.

McKeesport, Pa.—Superintendent D. M. White, Water Works Department, will secure estimates on four plungers, four plunger rods, four low-pressure piston rods and four valve stem rods; also advertise for bids for laying water pipe on Walnut st.

York, Pa.—Matter of municipal ownership of water works has again been taken up by Council.

Fort Mill, S. C.—Citizens of this place are urging construction of water works system. Capt. J. W. Ardrey is interested.

Bryan, Tex.—City is considering \$100,000 expenditure for construction of water works, electric light plant and sewer system.—J. C. Nagle, City Engineer.

Williamsburg, Va.—Robert A. Conard of Gordon & Conard, Maryland Bldg., Washington, D. C., will apply for franchise for water, sewerage and electric light systems.

Cody, Wyo.—Town proposes to construct water works; cost \$80,000.—Russell Kimball, Engineer.

Claresholm, Alta., Can.—Citizens have voted to issue \$15,000 water works debentures.—Geo. Simpson, Secretary-Treasurer.

Galt, Ont., Can.—By-law to provide \$5,000 for water works extensions has been passed.

La Tuque, Que., Can.—Council will soon call for tender for construction of a water works system; estimated cost, \$300,000.

St. John, N. B., Can.—Plans by City Engineer Murdoch for renewal of water pipes have been accepted; estimated cost \$38,000.

St. Thomas, Ont., Can.—Hazen & Whipple have recommended improvements to cost \$32,000, including: Construction of a coagulating basin and aerator, \$8,500; connections to and from this basin to the pumps, to consist of 80-in. c.-l. pipe, \$3,000; installation of two electrically driven centrifugal pumps, \$1,500; construction of, pure water reservoir of covered concrete, reinforced with steel, with fire equipment and cap, of 600,000 gals, \$8,500; installation new coagulating apparatus and controllers on discharge lines to regulate flow of the filter, \$2,500; installation of proper loss of head gauges, \$2,500; engineering, \$4,200.—Jas. A. Bell, City Engineer.

Welland, Ont., Can.—Engineer Kennedy, Montreal, Que., has submitted to Water Commission report on improving water works, and estimates cost at \$60,000.

CONTRACTS AWARDED

Ft. Oglethorpe, Ga.—Constructing water distribution system to Newport Engr. & Const. Co., Newport News, Va., \$15,399.

Aurora, Ill.—Drilling and casing deep well, approximate depth 2,250 ft., to Gillchrist & Temmis, Chicago, \$4.90 per ft.; total cost \$11,025.—T. D. Stinson, Superintendent of Water Department.

South Bend, Ind.—Sinking 20 10-inch artesian wells to R. H. Kersey, city; two 300-hp. alternating motors to Fairbanks & Morse Co., Chicago, \$6,097.

Crystal Springs, Miss.—Hemispherical bottom steel tank, 100,000 gal., to Memphis Steel Construction Co.; cost \$4,070.—C. Plummer, City Engineer.

College Grove, Ore.—Water system, to American Water and Light Co., Kansas City, Mo., \$92,000.

Tacoma, Wash.—Laying water mains, District No 544, to Keasel Construction Co., \$21,202.

Niagara Falls, Ont., Can.—Filtration plant to Norwood Engineering Co., Florence, Mass., \$234,565.

BIDS RECEIVED

Perth Amboy, N. J.—Two 200-h.p. 175-lb. steam pressure, water tube boilers, to be used in connection with new 12,000,000-gal. pump; Erie City Iron Works, lowest bidder, \$4,435, with additional charge of \$90 for hot drawn seamless tubes if wanted; Erie City Iron Works, \$4,877; Oil City Boiler Works, \$5,200; Heine Safety Boiler Co., \$4,775; E. Keeler Co., \$5,415; Babcock & Wilcox Co., \$8,500 and \$7,000.

New York, N. Y.—Contract No. 44, sluice gates, and Contract No. 80, constructing tunnels, as follows: Contract 44, furnishing, delivering and installing 6 6-ft. by 15-ft. sluice gates, 25 5-ft. by 13-ft. sluice gates, 4 5-ft. by 8-ft. back pressure sluice gates, 7 5-ft. by 8-ft. sluice gates, 6 5-ft. by 6-ft. sluice gates, 25 5-ft. by 13-ft. sluice gates, 3-ft. by 5-ft. sluice gates, 3 30-in. by 42-in. sluice gates, 2 18-in. by 24-in. sluice gates, with operating mechanisms, 2 sets of drive shafting and all appurtenances, complete, at Ashokan, Kensico and Hill View reservoirs, and in various structures along Catskill aqueduct; approximate totals of bids received, Snare & Triest, 143 Liberty st.,

\$219,520; Wheeling Mould and Foundry Co., 30 Church st., \$199,605; Ogden Iron and Steel Co., 143 Cedar st., \$208,300; Caldwell, Wilcox Co., Newburgh, N. Y., \$187,578, and Coffin Valve Co., Boston, Mass., \$208,356. Contract 80, construction of Breakneck tunnel, portions of Hudson River division of Catskill aqueduct, comprising about 710 ft. of plain concrete conduit known as aqueduct in open cut, or cut-and-cover aqueduct, 17 ft. high x 17 ft. 6 in. wide inside, and a tunnel on the hydraulic gradient about 1,055 ft. long, 17 ft. high x 13 ft. 4 in. wide inside, connecting by a shaft about 590 ft. deep with a deep pressure tunnel 14 ft. inside diameter and about 700 ft. long. approximate totals of bids received: Dravo Contracting Co., Pittsburgh, Pa., \$456,515; Geo. W. Jackson, Chicago, Ill., \$585,513; Hagerty & Drummond, 41 Park Row, \$584,876; Metropolitan Contracting Co., Boston, Mass., \$547,792; Patterson Co., \$581,830; P. J. Carlin Construction Co., 16 E. 23d st., \$573,505; McArthur Bros., 7 Pine st., \$584,412.

Niagara Falls, N. Y.—Filtration plant for new water supply system: Fred T. Ley & Co., New York, 300 working days, \$283,830, \$285,800, \$279,300, \$235,000; Norwood Engineering Co., Florence, Mass., 350 days, \$234,565; American Water Softener Co., Philadelphia, Pa., 280 days, \$250,315; Pittsburgh Filter Manufacturing Co., 425 days, \$250,315; New York Continental Jewell Filtration Co., 460 days, \$260,670; Roberts Filter Manufacturing Co., Pittsburgh, Pa., 350 days, \$258,607.50; bids were submitted on plans that called for rapid sand filtration of 15,000,000 gals. daily.—W. D. Robbins, Commissioner's Engineer; John W. Alvord and Charles B. Burdick, Chicago, Consulting Engineers.

Dallas, Tex.—Furnishing valves from 4 to 36 inches for water department, as follows: Gamet Co., 12-in. \$35.63 each, 6-in. \$8.55; F. W. Helman Co., Houston, 36-in. \$520 each, 4-in. \$7; Bourbon Copper and Brass Works Co., Cincinnati, O., 12-in. \$31 each, 4-in. \$6.70; Pittsburgh Manufacturing Co., J. H. Wall, Secretary, 12-in. \$37 each, 4-in. \$8.35; Fairbanks Co., New Orleans, 36-in. \$573 each, 4-in. \$6.65, total for all sizes \$3,979.50; Crane Co., 36 to 16-in., total \$2,660.54; from 12 to 4-in. \$813.75, total \$3,474.29; James B. Clow & Sons, Chicago, 36-in. \$700 each, 4-in. \$8.50, with a small per cent off for carload lots; Eddy Valve Co., Waterford, N. Y., 36-in. \$550 each, 4-in. \$7.50; Chapman Valve Manufacturing Co., St. Louis, 36-in. \$495.65 each, 4-in. \$6.85; about 60 different valves in all are to be bought.

LIGHTING AND POWER

Elba, Ala.—Pea River Power Co. is preparing plans for proposed water power electrical plant.—H. D. Boyd, Secretary.

Murfreesboro, Ark.—Little Missouri Water Power Co. has been incorporated, capital of \$100,000, by H. E. Bemis, W. V. Tompkins, M. W. Greeson and associates; company plans to construct two dams to develop electricity for transmission within radius of 40 miles to Arkadelphia, Hope, Prescott, Texarkana, Ashdown and De Queen.

Wilton, Ark.—Lee Wilson & Co. will rebuild burned power plant.

Long Beach, Cal.—Plans are being prepared by Southern California Edison Co., Los Angeles, for proposed \$2,000,000 power

Brooklyn, N. Y.—Bids were opened May 11 by the Commissioner of Water Supply, Gas and Electricity, New York City, for furnishing, delivering and laying high-pressure fire service mains and appurtenances, in Gowanus and South Brooklyn districts, and the following are the totals of the bids received, also net prices on some of the principal items: the totals include valve boxes and hydrants: (a) F. V. Smith Contracting Co., 147 E. 125th St., N. Y. City, \$557,062; (b) Michael J. Dady, Brooklyn, \$625,042; (c) Murphy Bros., Brooklyn, \$553,217; (d) Jas. H. Holmes, Brooklyn, \$523,974; (e) Hagerty & Drummond, 41 Park Row, N. Y. City, \$537,338; (f) Sanford Co., Brooklyn, \$497,897.

	(A)	(B)	(C)	(D)	(E)	(F)
9,260 tons street c. i. pipe.....	\$28.95	\$34.45	\$34.00	\$27.50	\$29.15	\$27.15
410 tons c. i. castings (A).....	55.50	75.00	67.00	120.00	58.30	75.90
170 tons c. i. castings (B).....	55.50	75.00	58.00	50.00	58.30	75.90
28 tons c. i. castings.....	300.00	200.00	180.00	485.00	220.00	185.15
190 tons c. i. castings.....	50.00	70.00	42.60	40.00	52.80	42.00
37,500 lin. ft. 20-in. pipe.....	2.00	1.60	1.50	1.25	1.43	1.52
20,200 lin. ft. 16-in. pipe.....	1.65	1.40	1.25	.95	1.32	1.42
6,600 lin. ft. 12-in. pipe.....	1.40	1.20	.90	.80	1.16	1.07
3,500 lin. ft. 8-in. pipe.....	1.15	2.00	1.20	.70	1.10	.93
480 cu. yds. stone.....	2.50	3.00	2.00	.01	1.76	2.00
290 cu. yds. brick masonry.....	12.00	15.00	12.00	12.00	13.20	12.00
245 cu. yds. concrete masonry.....	4.00	7.00	6.00	8.00	11.00	8.00
35 M ft. lumber.....	30.00	35.00	20.00	20.00	44.00	.01
89,000 lbs. iron and steel.....	.04	.10	.08	.05	.07	.05
2,900 sq. ft. flag.....	.05	.20	.02	.20	.04	.05
3,000 sq. ft. cement walk.....	.20	.20	.15	.01	.17	.20
1,100 lin. ft. curb.....	.10	.20	.40	.01	.01	.01
1,000 sq. yds. Belgian block.....	.40	.50	.25	.50	.55	.30
9,000 sq. yds. granite pavement.....	.50	.50	.30	.50	.01	.35
5,000 sq. yds. granite pavement.....	1.50	3.00	1.25	1.50	2.75	2.25
4,500 sq. yds. asphalt pavement.....	3.00	3.00	2.75	2.25	3.30	2.10
4,000 sq. yds. asphalt pavement.....	3.00	3.00	3.00	2.50	2.75	3.00
100 sq. yds. brick pavement.....	3.00	3.00	2.00	.01	.01	2.50
7,500 cu. yds. extra excavation.....	1.50	1.00	.80	.01	1.25	.25
400 cu. yds. rock excavation.....	4.00	5.00	.01	4.00	5.50	.01
1,000 lin. ft. vitrified pipe.....	1.50	1.00	1.00	.50	1.10	.50